APPENDIX D

HAZARD IDENTIFICATION AND RISK ASSESSMENT INFORMATION

Peninsula
Hazard Mitigation Plan Update

Kick-off Meeting

September 20, 2010

Dewberry

NRW Engineering, P.C.
Consulting Structural Engineers

RESOURCE STACK, INC.

Meeting Agenda

1. Welcome & Introductions
2. The Dewberry Team
3. Plan Update Requirements
4. Plan Update Process and Schedule
5. Problem Spot Analysis
6. Public Outreach Website
7. Wrap Up & Future Meetings - Tracy Hanger
   Deborah Mills & Committee

Corporate Overview

Dewberry

- 50 years in Northern Virginia
- 2,000 professionals
- More than $300 M annual revenue
- Core service: Emergency Management and Hazard Mitigation

- Woman-owned structural engineering consulting firm based out of Virginia Beach, Virginia.
- Responsible for mitigation project scoping.

NRW Engineering, P.C.
Consulting Structural Engineers

RESOURCE STACK, INC.

- Small business focusing on web-based applications.
- Designing, launching, hosting and maintaining a public access web site for this project.

It's Your Plan

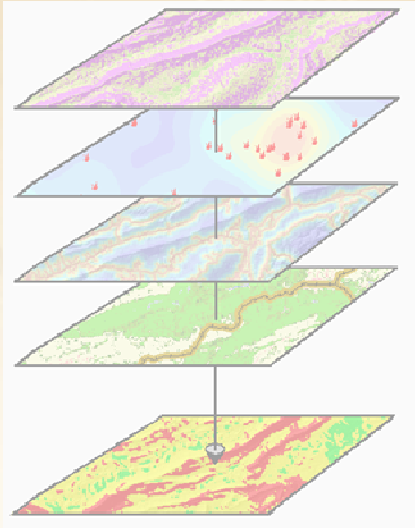
- We are here to:
  - Facilitate the process
  - Lend technical expertise and consultation
  - Do the heavy lifting and dirty work
- You need to:
  - Participate & Make the final decisions
  - Ensure a feasible plan that meets regional, community and stakeholder needs

Understanding Requirements

- **New FEMA Local Plan Requirements**
  - Clear roadmap on update process
  - Incorporate previous plan crosswalk comments
  - Integrate NFIP program
  - Describe current status of projects
  - Address critical facilities

Understanding Requirements

- **Challenges unique to region**
  - Scheduling conflicts
  - Disasters happen
  - Multiple GIS sources
  - Complicated review process



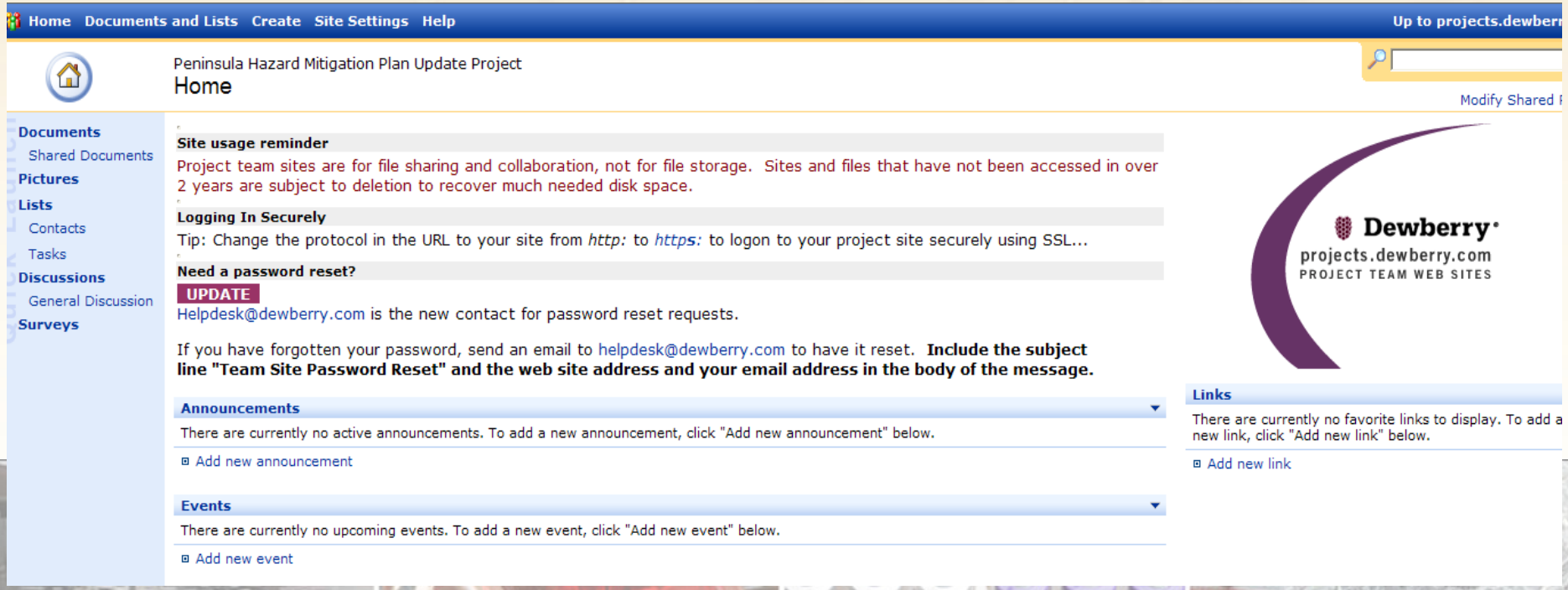
Project Task	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June
Project Management										
Project Kick off Meeting	1 mtg									
Community Profiles & Capability Assessment										
Hazard Identification & Risk Assessment										
HIRA and Initial Goals & Objectives Meetings					3 mtgs					
Manmade Hazard Assessment										
Mitigation Goals, Objectives										
Mitigation Strategies/ Projects Prioritization Meetings						6 mtgs				
Priority Project Scoping										
Plan Production & Adoption										
Plan Production & Adoption Meetings								6 mtgs		1 mtg

Planning Support

- Encourage diverse Steering Committee membership
- Meet up to two times with each participating jurisdiction
- Use multi-faceted approach to public input
- Stay in constant communication

Tools We Use

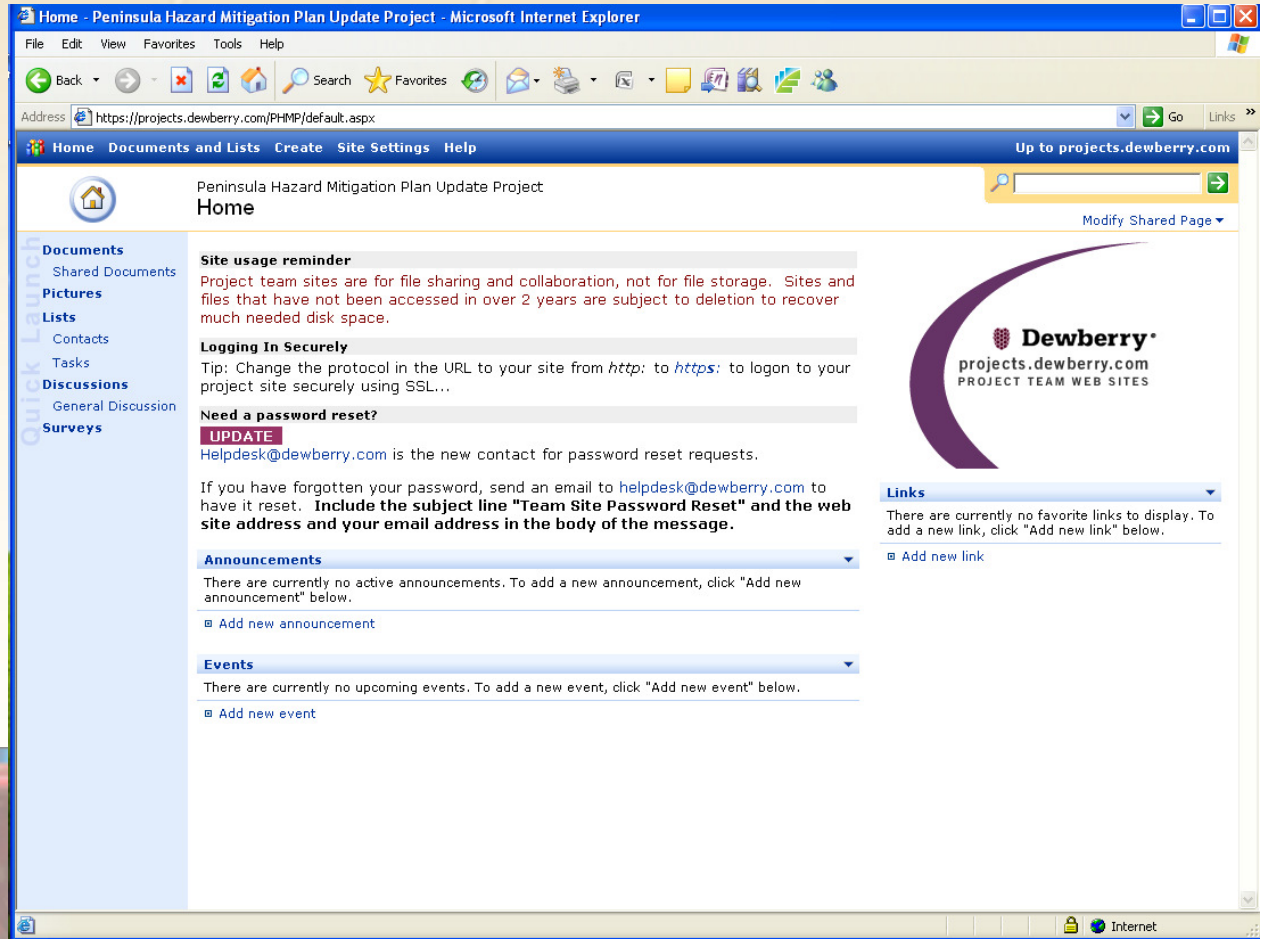
- Facilitated Meetings
- Public Workshops
- Secure Peninsula Project Share Site



SharePoint

- http://projects.dewberry.com/PHMP
- Requires:
  - **Username**
  - **Password**

Individual accounts will be Setup by Dewberry staff for each of the steering committee members

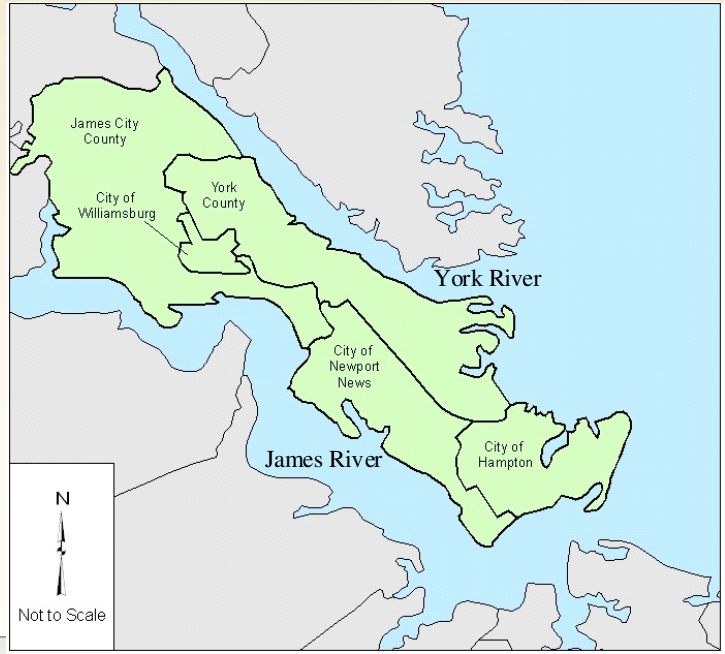


Understanding Requirements

- **New FEMA Local Plan Requirements**
  - Clear roadmap on update process
  - Incorporate previous plan crosswalk comments
  - Integrate NFIP program
  - Describe current status of projects
  - Address critical facilities

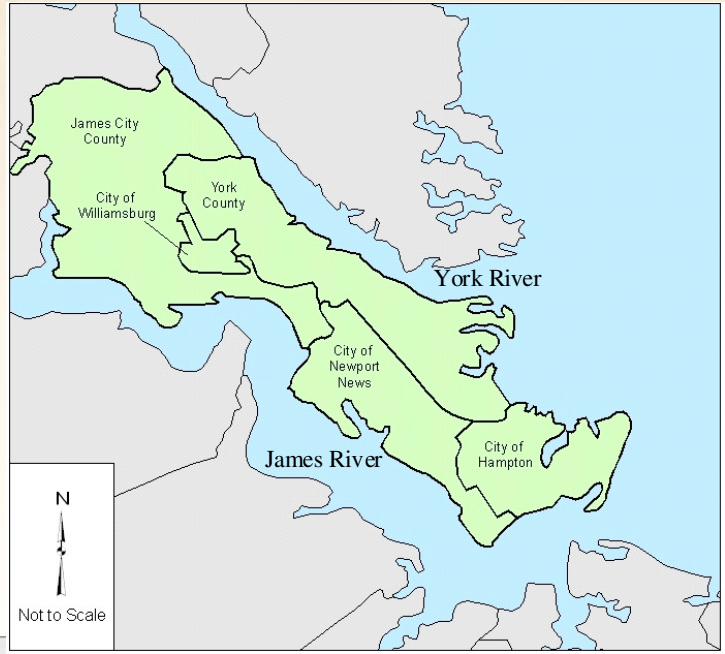
Participating Jurisdictions

- City of Hampton
- City of New Port News
- City of Williamsburg
- James City County
- York County



Background Information/Section leading into the HIRA

- Regional Profile
- Location & Profile of participating jurisdictions
- Demographics
  - Census Data and Projects
- Land Use and Development
  - Jurisdiction Specific data (SEE DATA MATRIX)
  - NLCD



FEMA Guidance for HIRA

- Identify Hazards
  - Which hazards are significant enough to warrant investigation?
  - How is each hazard defined?

- Profile Hazards
  - Identify Location (geographic areas affected) and Intensity
  - Information on Previous Occurrences
  - Probability of Future Events

Plan must include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks

FEMA Guidance for HIRA

- **Assess Vulnerability: ID Structures, Infrastructure, and Critical Facilities**
  - **Repetitive Loss Properties**
  - **Jurisdictions most threatened & vulnerable to damage and loss**
  - **Types/numbers most threatened & vulnerable to damage and loss (existing and future)**
  - ***Updated plan needs to Reflect changes in development for jurisdictions in hazard prone areas***

- **Assess Vulnerability: Estimating Potential Losses**
  - **Analysis of potential losses by jurisdiction**
  - **Analysis of potential losses to the identified vulnerable structures**
  - ***Updated plan needs to Reflect the effects of changes in development on loss estimates***

Requirements (Cross-Walk)

RISK ASSESSMENT: *§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.*

Risk Assessment	N	S
5. Identifying Hazards: §201.6(c)(2)(i)		X
6. Profiling Hazards: §201.6(c)(2)(i)		
7. Assessing Vulnerability: Overview: §201.6(c)(2)(ii)		
8. Assessing Vulnerability: Addressing Repetitive Loss Properties. §201.6(c)(2)(ii)		
9. Assessing Vulnerability: Identifying Structures, Infrastructure, and Critical Facilities: §201.6(c)(2)(ii)(B)		
10. Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)		
11. Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)		
12. Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)		

RISK ASSESSMENT: *§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strateg losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize ap mitigation actions to reduce losses from identified hazards.*

5. Identifying Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the type … of all natural hazards that can affect the jurisdi*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments		
A. Does the new or updated plan include **a description** of the types of **all natural hazards** that affect the jurisdiction?				
		SUMMARY SCORE		

6. Profiling Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the risk assessment identify the **location** (i.e., geographic area affected) of each natural hazard addressed in the new or updated plan?				
B. Does the risk assessment identify the **extent** (i.e., magnitude or severity) of each hazard addressed in the new or updated plan?				
C. Does the plan provide information on **previous occurrences** of each hazard addressed in the new or updated plan?				
D. Does the plan include the **probability of future events** (i.e., chance of occurrence) for each hazard addressed in the new or updated plan?				
		SUMMARY SCORE		

*Risk Assessments needed for EACH JURISDICTION to reflect the unique or varied risk

Hazard Identification & Risk Assessment (HIRA)

- 2006 Plan completed by AMEC
- 2010 Update
  - Start with 2006 Plan data &update based on:
    - Historical Occurrences (NCDC Storm Events, Federal Declared Disasters, Local News, and Steering Committee)
    - Virginia Hazard Ranking Methodology
  - Re-format to follow FEMA Cross-walk requirements and to streamline hazard-specific information.
  - Create Regional & Jurisdictional Maps that supplement HIRA analysis (very limited in 2006 plan)
  - Provide overall results for the Jurisdictions and Region

HAZARD IDENTIFICATION

- 2006 Identified Hazards

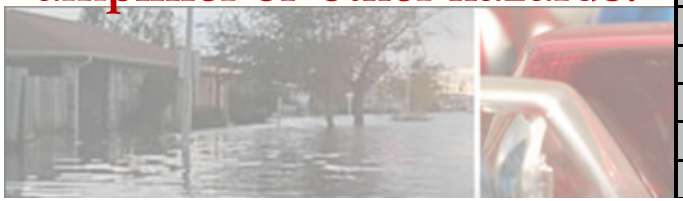
- **Flooding**
- **Hurricanes & Tropical Storms**
- **Tornados**
- **Nor'easters**
- **Thunderstorms**
- **Winter Storms**
- **Extreme Heat**
- **Dam Failure**
- **Wildfire**
- **Drought**
- **Earthquakes**
- **Biological Hazards/Epidemics**
- **Landslides**
- **Expansive Soils**
- **Tsunamis**

Steering Committee:

Does this still represent your region?

Any hazards missing?

Climate Change as an amplifier of other hazards?



Hazard type	Non-Critical/Critical	Hazard Level
Flooding	Critical	High
Hurricanes	Critical	High/Medium
Tornados	Critical	Medium
Wildfire	Critical	Medium
Nor'easters	Critical	Medium/Low
Winter storms	Critical	Medium/Low
Drought	Non-Critical	Low
Earthquakes	Non-Critical	Low
Biological Hazards/Epidemics	Non-Critical	Low
Thunderstorms	Non-Critical	Low
Dam Failure	Non-Critical	Low
Extreme Heat	Non-Critical	Low
Expansive Soils	Non-Critical	Low
Landslides	Non-Critical	Low
Sea Level Rise	Non-Critical	Low
Tsunamis	Non-Critical	Low

2010 Commonwealth State-wide Hazard Rankings

High

- Flood

Medium-High

- Non-Rotational Wind
- Winter Weather

Medium

- Tornado
- Drought
- Wildfire

Medium-Low

- Earthquake
- Landslide

Low

- Karst
- Dam Failure

Hazard Naming Ambiguity

- Interrelated Hazards
- Review Virginia State Plan to check hazard "labels"
  - Do these seem reasonable? What's missing?

Table 3.6- 3: Summary of hazard events by HIRA category hazards.

Flood	Non-Rotational Wind	Winter Weather	Tornado	Drought	Wildfire
Riverine Coastal Tsunami Erosion Hurricane Nor'Easter	Wind Thunderstorm Hurricane	Snow Ice Extreme Cold Nor'Easter	Tornado	Drought Extreme Heat	Wildfire Lightning

Earthquake	Land Subsidence (karst)	Landslide	Dam Inundation	Human Caused
Earthquake	Land Subsidence	Landslide	Dam Failure	Accident Crime Terror

Local Plan Rankings & VA State Plan Ranking

Table 3.6- 2: Local HMP summary of hazard ranking and comparison with 2010 statewide hazard ranking results.

PDC/Jurisdiction	Flood	Erosion	Wind	Hurricane	Tornado	Thunder-storm	Lightning	Hail	Winter	Extreme Heat	Extreme Cold	Drought	Earthquake	Tsunami	Wildfire	HazMat	Landslide	Karst	Terrorism	Dam	Bio., Radio. & Epidemic
Lenowisco PDC	High	NA	Medium	Medium	Low	Medium	NA	Medium	Medium-High	Low	NA	Medium	Medium	NA	Medium-High	NA	Medium-High	Low	NA	Medium	NA
Cumberland Plateau PDC	High	NA	Medium	Medium	Low	Medium	NA	Medium	Medium-High	Low	NA	Medium	Medium	NA	Medium-High	NA	Medium-High	Low	NA	Medium	NA
Mount Rogers PDC	High	NA	Medium	Low	Low	Low	Low	NA	High	NA	NA	Medium	Low	NA	Medium	NA	Low	Low	NA	Medium	NA
New River Valley PDC	High	NA	Low	Low	NA	NA	Medium	NA	High	NA	NA	High	Low	NA	Medium	NA	Low	Low	NA	NA	NA
Roanoke Valley-Allegheny RC	High	NA	Medium	Medium	Low	NA	NA	NA	Medium-High	NA	NA	NA	Medium	NA	Medium-High	NA	Medium	NA	NA	NA	NA
Central Shenandoah PDC	High	NA	High	High	Medium	NA	NA	NA	High	NA	NA	High	NA	NA	Medium	NA	Low	Medium	Low	NA	NA
Northern Shenandoah Valley RC	Medium	NA	Low	Low	Low	NA	NA	Low	High	Low	High	Low	NA	NA	Medium	Low	Low	Low	NA	NA	NA
Northern Virginia RC	High	Low	Medium	Medium	High	High	NA	NA	High	Low	Low	Medium	Low	NA	Medium	NA	Low	Low	NA	Low	NA
Rappahannock-Rapidan RC	High	Low	High	High	Medium	Medium	NA	NA	High	NA	NA	Medium	Low	NA	Low	NA	Low	Low	NA	Low	NA
Thomas Jefferson PDC	High	NA	Low	Medium	Low	NA	Low	NA	Medium	Low	Low	Low	Low	NA	Low	NA	Low	NA	NA	Low	NA
Region 2000 LGC	High	NA	Medium	High	Medium	NA	NA	NA	High	NA	NA	High	NA	NA	Medium	NA	Low	Low	Low	Low	NA
West Piedmont PDC	Medium	NA	Medium	Low	Low	NA	NA	NA	High	NA	NA	Low	NA	NA	Low	Medium	NA	NA	Low	High	NA
Southside PDC	High	NA	Medium	High	Medium	Medium	Low	Medium	Medium	Low	NA	Medium	Low	NA	Low	NA	Low	NA	NA	High	NA
Commonwealth RC (Virginia's Heartland)	Medium	Low	High	High	Medium	Medium	NA	NA	High	NA	NA	High	Low	NA	Medium	NA	Low	Low	NA	Low	NA
Richmond Regional PDC	High	NA	Medium	Medium	Low	NA	NA	Low	Medium	Low	NA	Low	NA	NA	Low	NA	Low	NA	NA	NA	NA
George Washington RC	High	NA	Medium	Medium	Medium	High	NA	NA	High	Low	NA	Low	Low	NA	High	Low	Low	NA	NA	Low	Low
Northern Neck PDC	Medium	Medium	High	High	Low	NA	NA	NA	Medium	NA	NA	Low	NA	NA	Low	NA	NA	NA	NA	NA	NA
Middle Peninsula PDC	High	Medium	Medium	High	High	Medium	Low	NA	High	Low	Low	Low	Low	NA	Medium	NA	Low	Low	NA	Medium	NA
Crater PDC	High	NA	Medium	Medium	Low	Medium	NA	Medium	Medium	NA	NA	Low	NA	NA	Low	NA	NA	NA	NA	NA	NA
Accomack-Northampton PDC	High	High	High	High	NA	NA	NA	NA	Medium	Medium	NA	Medium	NA	NA	Low	Low	NA	NA	NA	NA	NA
Southside Hampton Roads PDC	High	Low	High	High	Medium	Medium	Medium	NA	High	Low	Low	Low	Low	Medium	Low	NA	Low	Low	NA	Low	NA
Peninsula Group	High	NA	Medium-High	Medium-High	Medium	Low	NA	NA	Medium-Low	Low	NA	Low	Low	Low	Medium	NA	Low	Low	NA	Low	Low
Amelia County	Low	NA	Low	Low	Medium	Low	Low	Low	Low	NA	NA	Low	Low	NA	Medium	NA	NA	NA	NA	NA	NA
Southampton County	High	Low	High	High	Medium	High	NA	NA	Medium	Low	Low	Medium	Low	NA	Medium	Medium	Low	Low	Low	Low	Medium
City of Chesapeake	High	Low	High	Medium-High	Medium-High	Medium	NA	Medium	Medium	Medium	NA	Medium-High	Low	Low	Medium	NA	NA	Low	NA	NA	NA
City of Franklin	High	Low	High	High	Low	High	NA	NA	Medium	Low	Low	Low	Low	NA	Low	High	Low	Low	Low	Low	Medium
City of Poquoson	High	NA	High	High	NA	NA	NA	NA	Low	NA	NA	NA	NA	NA	Medium	NA	NA	NA	NA	NA	NA
Average Ranking From Local Plans	High	Low	Medium	Medium-High	Medium-Low	Medium-Low	NA	Low	Medium-High	Low	NA	Medium-Low	Low	NA	Medium-Low	Low	Low	Low	NA	Low	NA
2010 Statewide Analysis Ranking	**High**	**NA[1]**	**Medium-High**		**Medium**	**NA[2]**	**NA[2]**	**NA[2]**	**Medium-High**	**NA[3]**	**NA[4]**	**Medium**	**Medium-Low**	**NA[1]**	**Medium**	**NA[5]**	**Medium-Low**	**Low**	**NA[5]**	**Low**	**NA[5]**

[1]Addressed in flood section 3.7; [2]Addressed in wind section 3.8; [3]Addressed in drought section 3.10; [4]Addressed in winter weather section 3.9; [5]Addressed in other sections of the COVEOP; chapter 5 for local plan assistance and chapter 7 enhanced plan

Identified Weaknesses in Existing Plan

Discussion with Planning Committee

- What do you like about current plan?
- Are there other efforts currently going on in your community that we should be aware of?
- Have the necessary people/departments been asked to participate?
- How can this plan help your agency?

Identified Weaknesses in Existing Plan

- What would you like changed in the revision?
  - Simple rather than wordy
  - Subject matter experts
  - Useful HIRA with better data
  - Social Vulnerability improved
    - Components to Address

Data Discrepancies

- What can be improved?
- Tying HIRA to specific mitigation projects/activities
- Does your locality/agencies have new data sources that have been created since the 2006 plan?
- What types of data would you like to see in the revision?

Data Needs for Update: Building & Critical Facilities

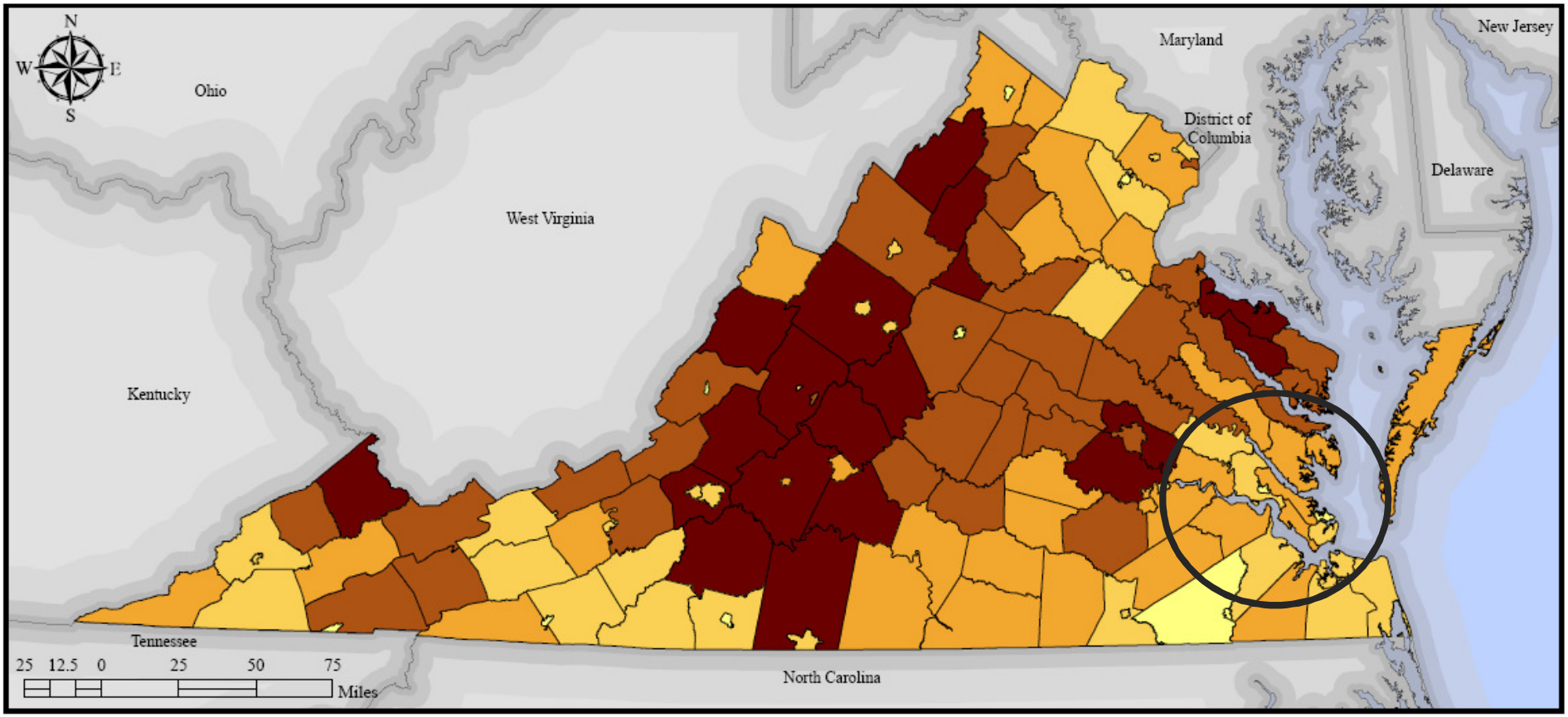
- Local Data
  - Building Specific (year, materials, value…)
  - Infrastructure
- Critical/Essential Facilities
  - Local Facilities with Building Specific Parameters
  - HAZUS-MH default Data
  - VDEM does not have a standard definition of a Critical Facility
    - 2010 HMP identifies broad types of CF with only general location:

Law Enforcement Facilities
Schools
EOCs
Fire Stations
Hospitals
Nursing Homes

Historical Disaster Databases

- List of Federally Declared Disasters from FEMA
  - Jurisdictions declared
  - Nature of disaster
  - Type(s) of assistance provided
- National Climatic Data Center (NCDC) Storm Events Database
  - Area Impacted
  - Damages
  - Description of event
- Department of Forestry
- Others??

Figure 3.3-1: Total Federally Declared Disasters



DATA SOURCES:

FEMA & VDEM Declared Disasters
VGIN Jurisdicational Boundaries
ESRI State Boundaries

LEGEND:

Number of Declared Disasters (1964-2008)

- 2 - 5
- 6 - 8
- 9 - 10
- 11 - 12
- 13 - 16

DATA IDENTIFICATION:

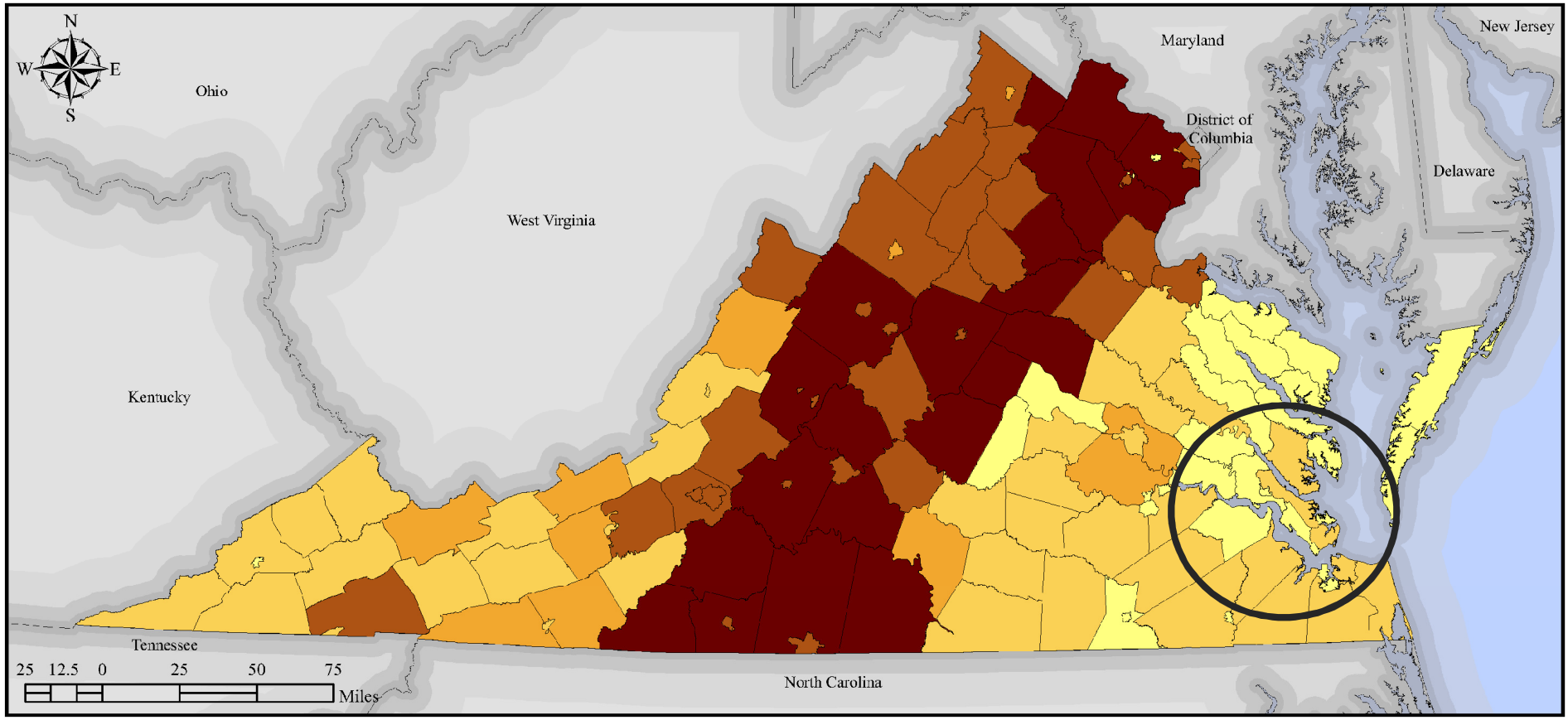
A declared federal disaster is any disaster in which Federal funding was allocated to a jurisdiction in the wake of a disaster incident. The sources and types of funding are not taken into account for this map.

The period of record for this map spans 1964 through 2008. Events were summarized based on FEMA and VDEM records.

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Figure 3.3-9: Total NCDC Events



DATA SOURCES:

NCDC Storm Events Database
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:

Number of Occurrences

- 4 - 104
- 105 - 160
- 161 - 218
- 219 - 305
- 306 - 475

DATA IDENTIFICATION:

This map represents the HIRA related hazard events, as recorded by NCDC, on a jurisdictional basis. Events include drought, flood, non-rotational winds, tornado, winter weather, wildfire, and landslide.

The NCDC period of record for this map ranges based on each hazard type. See Table 3.3-3 for hazard specific dates.

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

HIRA Category	NCDC Categories Included
Drought	Drought Drought / Excessive Heat
Flood	Flooding Flash Flood / Minor Flooding River Flood Urban / Small Stream Flooding Coastal Flood / Storm Surge Tidal Flooding
High Wind	Wind Strong / High / Gusty Wind Thunderstorm Wind Dry / Wet Microburst High Wind and Seas Hurricane Tropical Storm
Tornado	Tornado Waterspout Funnel Cloud Land spout
Winter Storm	Blizzard Snow / Heavy Snow Ice / Ice Storm Snow / Sleet / Rain Winter Storm Winter Weather / Mix Freezing Rain
Wildfire	Wild / Forest Fire
Landslide	Mudslide Rockslide Landslide Debris Flow

Other event types in NCDC:

EXTREME COLD
EXTREME COLD/WIND
CHILL
EXTREME WINDCHILL
EXCESSIVE HEAT
LIGHTING
LIGHTNING
AGRICULTURAL FREEZE
ASTRONOMICAL HIGH TIDE
BLACK ICE
Black Ice
COLD
Cold
Cold and Frost
COLD/WIND CHILL
DENSE FOG
DUST DEVIL
EXCESSIVE
FOG
FREEZE
FREEZING FOG
FROST
FROST/FREEZE
HAIL
HAIL DAMAGE
HEAT
HEAT WAVE
HEAVY RAIN
HEAVY SEAS
HEAVY SURF
HEAVY SURF/HIGH SURF
HIGH SURF
MONTHLY PRECIPITATION
MONTHLY RAINFALL
MONTHLY TEMPERATURE
PROLONG COLD
Prolong Cold
PROLONG WARMTH
RECORD COLD
RECORD HEAT
RECORD WARMTH
Record Warmth
RIP CURRENT
UNSEASONABLY COLD
UNSEASONABLY WARM
UNUSUALLY COLD
UNUSUALLY WARM

Data Needs for Update: Hazard Specific

- Hazard Data
  - Flood: FEMA FIRMs, FEMA Rep Loss, SLOSH Model, NCDC & HAZUS-MH
  - Tornado: NCDC & SVRGIS
  - High Wind & Hurricane/Tropical Storm: HAZUS-MH, NCDC & SVRGIS
  - Severe Thunderstorms: NCDC & SVRGIS
  - Winter Weather: NCDC
  - Earthquake: USGS, HAZUS-MH
  - Wildfire: VDOF & NCDC
  - Dam Failure: NID & DCR
  - Landslides USGS, DMME
- Land Use
  - Local Planning Efforts (population changes and/or shifts, changes in land use activities)
  - National Land Cover Data (NLCD)

Hazard Ranking

- The purpose of the hazard identification and risk assessment is to provide a factual basis for developing mitigation strategies, and in so doing, to prioritize those jurisdictions which most threatened and vulnerable to natural hazards.

- FEMA guidance indicates that the jurisdictions at greatest risk to specific hazards should be identified, considering both the characteristics of the hazard and the jurisdictions' degree of vulnerability. A variety of analysis methods may be sufficient to meet these goals; FEMA does not mandate a specific analysis method.

Hazard Ranking

- Many plans have developed their own ranking system, but these ranking systems are generally based on geographic data describing the incidence and/or severity of each hazard, as well as the populations vulnerable to each hazard.

- Examples of ranking methods used in other state/local plans:
  - Scoring systems based on expert judgment
  - Scoring systems based on GIS / Data analysis
  - Annualized loss ($) calculations

2006 Natural Hazard Ranking Sheet

- **Critical hazards:** historical data impacts have resulted in significant losses to the region and citizens. Occur with little or no warning and have the possibility to create such widespread destruction requiring external response & recovery resources. recover.
- **Non-critical hazards:** Very infrequently or have not occurred at all in the historical data. Not considered a widespread threat resulting in significant losses of property or life. Also include hazards that occur frequently and those that the jurisdiction is equipped to mitigate.

Hazard type	Non-Critical/Critical	Hazard Level
Flooding	Critical	High
Hurricanes	Critical	High/Medium
Tornados	Critical	Medium
Wildfire	Critical	Medium
Nor'easters	Critical	Medium/Low
Winter storms	Critical	Medium/Low
Drought	Non-Critical	Low
Earthquakes	Non-Critical	Low
Biological Hazards/Epidemics	Non-Critical	Low
Thunderstorms	Non-Critical	Low
Dam Failure	Non-Critical	Low
Extreme Heat	Non-Critical	Low
Expansive Soils	Non-Critical	Low
Landslides	Non-Critical	Low
Sea Level Rise	Non-Critical	Low
Tsunamis	Non-Critical	Low

Vulnerability Assessments completed for:

- **Flooding**
- **Hurricanes**
- **Tornados**
- **Wildfire**

Priority of Hazards

- **Completed separately for each jurisdiction**
- **Appendix D - York County Example:**

Hazard	Probability of Occurrence	Public Perception of Occurrence	Historical Occurrence	References
YORK COUNTY				
Winter Weather	L	M	1998	HMPC, FEMA, NCDC/NWS/Newspaper
Thunderstorm / Lightning	H	H		HMPC, NOAA-NCDC/Newspaper
Wind	M	L	1990-2003	HMPC, NOAA-NCDC/NWS
Hurricanes	M	M	1999-2003	HMPC, NWS/Newspaper
Tornadoes	L	L	2003	HMPC, NWS/Newspaper
Drought	L	L	2002	HMPC, NWS/Newspaper
Earthquakes	L	L	1995	HMPC, USGS/Newspaper
Landslides	L	L	N/A	NONE
Sea Level Rise	H	L		HMPC, VIMS/Website
Wildfires	M	L		Fire Marshal/Park Service
Biological Hazards	M	H		Mosquito Control
Floods - Riverine	L	L		HMPC, FEMA, NCDC
Floods - Coastal	M/H	M		HMPC, FEMA, NCDC
Dam Failures	L	L		

H=High; M=Moderate; L=Low; N=No; N/A=Not Applicable, Unknown=Historical Data Unavailable; OEM=York County Office of Emergency Management; HMPC = York County Hazard Mitigation Planning Committee; NCDC=National Climatic Data Center; FEMA=Federal Emergency Management Agency; USGA=United States Geological Survey; MHA=Multi-Hazard Atlas

Potential Hazard Ranking Option

- Desire to rank hazard risk (from each hazard) in each jurisdiction, and at the overall jurisdiction level
- This requires that hazard risks tabulated/accounted in some comparable system
- Jurisdictional hazard rankings have been determined based on a scoring system which considers a variety of relevant parameters:
  - Population and/or Population Density — Census
  - Property & Crop Damage — NCDC
  - Deaths/Injuries — NCDC
  - Annualized Events — Hazard-Specific Sources
  - Geographic Extent — Hazard-Specific Sources

VA State Ranking Parameters

- ***Semi-Quantitative*** **Scoring System**
  - **Actual Data Values grouped in categories 1-4 based on statistics**
- **NCDC Data with normalization (inflation …)**
  - **Limitations with probability & impact data**
- **Parameters Used:**
  - **Population Vulnerability (weight 0.5)**
  - **Population Density (weight 0.5)**
  - **Geographic Extent (weight 1.5)**
  - **Annualized Deaths & Injuries (weight 1)**
  - **Annualized Crop & Property Damage (weight 1)**
  - **Annualized Events (weight 1)**

Jurisdictional Risk (RS):

RS = (0.5*(PV + PN)) + ID + EV + PD + CD + (1.5*GE)

Table 3.5-1 Population Vulnerability (PV)		
Rank	Description	
1	<= 0.229 %	of population
2	0.230% - 0.749%	of population
3	0.750% - 2.099%	of population
4	> = 2.100%	of population

Table 3.5-2 Population Density (PN)		
Rank	Description	
1	<= 60.92	people/sq mi
2	60.93 – 339.10	people/sq mi
3	339.11 - 1,743.35	people/sq mi
4	>= 1,743.36	people/sq mi

Table 3.5-6 Annualized Events (EV)		
Rank	Definition	
1	<= 0.09	events per year
2	0.10 – 0.99	events per year
3	1.00 – 4.99	events per year
4	>= 5.00	events per year

Table 3.5-4 Annualized Deaths & Injuries (ID)		
Rank	Definition	
1	<= 1.019	D&I per year
2	1.020 – 6.279	D&I per year
3	6.280 – 13.199	D&I per year
4	>= 13.200	D&I per year

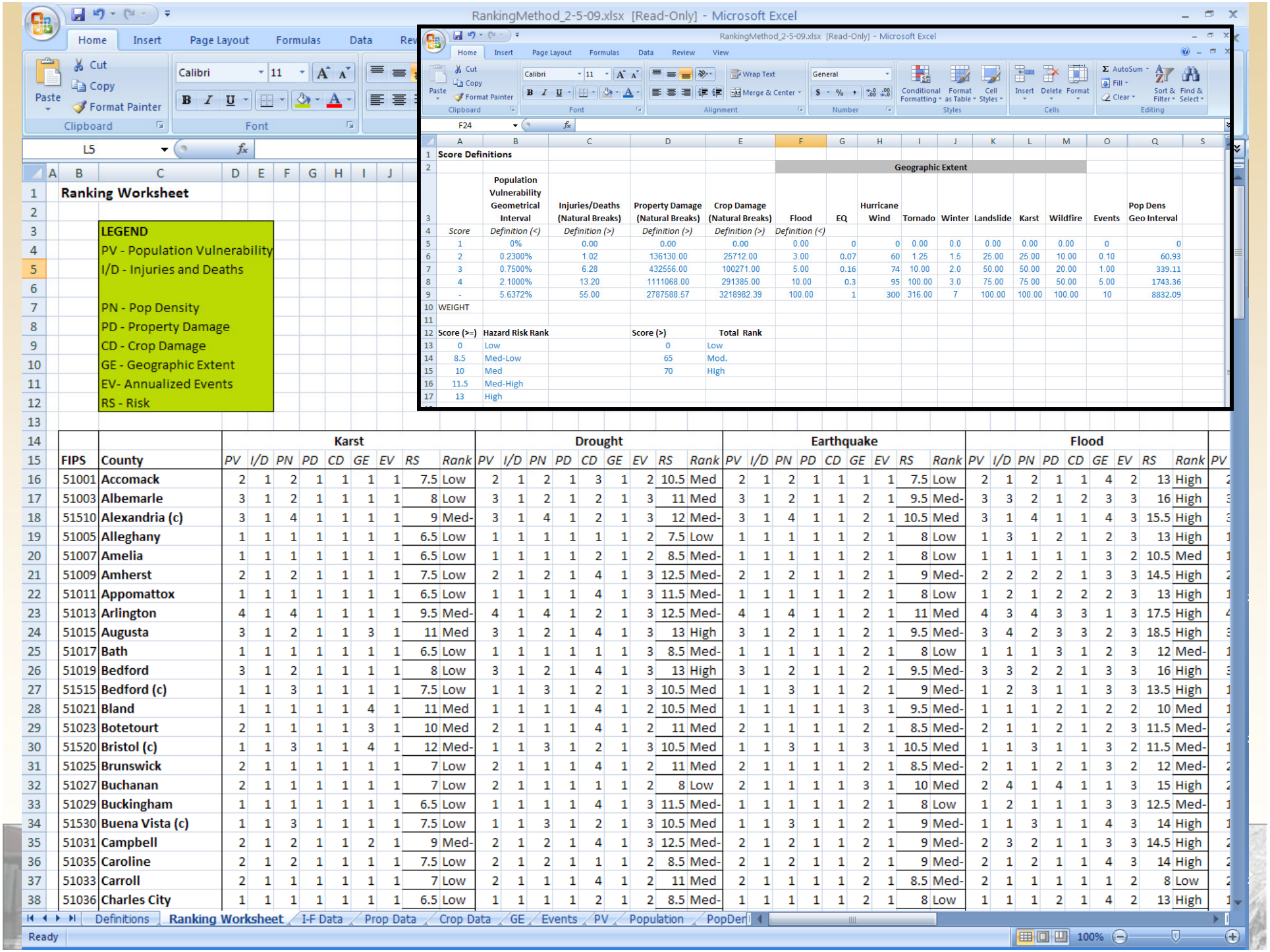
Table 3.5-5 Annualized Crop and Property Damage (CD, PD)		
Rank	Definition: Crop Damage	Definition: Property Damage
1	<= $25,711 per year	<= $ 136,129 per year
2	$25,712 – $100,270 per year	$136,130 - $432,555 per year
3	$100,271 - $291,384 per year	$432,556 - $1,111,067 per year
4	>= $291,385 per year	>= $1,111,068 per year

Table 3.5-3 Geographic Extent : Percentage of a jurisdiction impacted by the hazard (GE)

Hazard	Description	Category Breaks	
		Rank	Description
Flood	Percent of a jurisdiction that falls within FEMA Special Flood Hazard Area (SFHA). *Data: FEMA Floodplains (DFIRMs)*	1	<=2.99%
		2	3.00-4.99%
		3	5.00 -9.99%
		4	>=10.00%
High Wind	Average maximum wind speed throughout the entire jurisdiction. *Data: HAZUS 3-second Peak Gust Wind Speeds*	1	<= 59.9
		2	60.0 - 73.9
		3	74.0 - 94.9
		4	>= 95.0
Wildfire	Percent of jurisdiction that falls within a "high" risk. *Data: VDOF Wildfire Risk Assessment*	1	<= 9.9%
		2	10.0% - 19.9%
		3	20.0% - 49.9%
		4	>= 50.0%
Karst	Percent of jurisdiction where the risk is "high" for karst related events. *Data: USGS Engineering Aspects of Karst*	1	<= 24.9%
		2	25.0% - 49.9%
		3	50.0% - 74.9%
		4	>= 75.0%
Landslide	Percent of jurisdiction where a high landslide risk exists. *Data: USGS Landslide Incidence & Susceptibility*	1	<= 24.9%
		2	25.0% - 49.9%
		3	50.0% - 74.9%
		4	>= 75.0%
Earthquake	Average 2500-year return period max percent of gravitational acceleration (PGA). *Data: HAZUS 2500-year PGA*	1	<= 0.069
		2	0.070 - 0.159
		3	0.160 - 0.299
		4	>= 0.300
Winter Storm	Average annual number of days receiving at least 3 inches of snow, calculated as an area-weighted average for each jurisdiction. *Data: NWS snowfall statistics*	1	<= 1.49
		2	1.50 - 1.99
		3	2.00 - 2.99
		4	>= 3.0
Tornado	Annual tornado hazard frequency (times one million), calculated as an area-weighted average for each jurisdiction. *Data: NCDC tornado frequency statistics*	1	<= 1.24
		2	1.25 - 9.99
		3	10.00 - 99.9
		4	>= 100.00

Jurisdictional Risk (RS):

RS = (0.5*(PV + PN)) + ID + EV + PD + CD + (1.5*GE)


RankingMethod_2-5-09.xlsx [Read-Only] - Microsoft Excel
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Page Layout
Formulas
Data
Review
View
Cut
Copy
Format Painter
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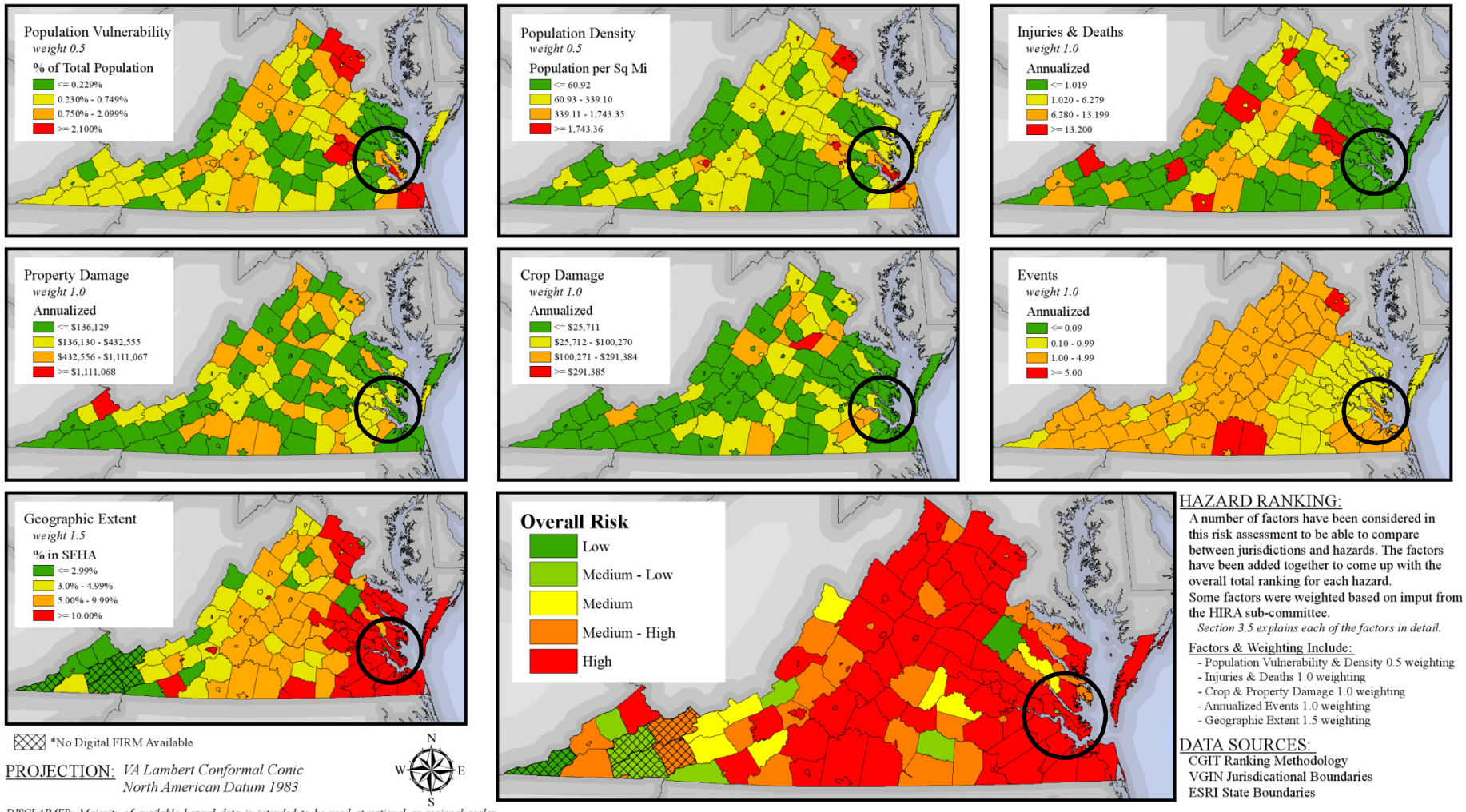
Calibri
11
Font
Wrap Text
Merge & Center
General
Number
Conditional Formatting
Format as Table
Cell Styles
Styles
Insert
Delete
Format
Cells
AutoSum
Fill
Clear
Sort & Filter
Find & Select
Editing
F24
L5
Ranking Worksheet
LEGEND
PV - Population Vulnerability
I/D - Injuries and Deaths
PN - Pop Density
PD - Property Damage
CD - Crop Damage
GE - Geographic Extent
EV- Annualized Events
RS - Risk
Score Definitions
Geographic Extent
Population Vulnerability Geometrical Interval
Injuries/Deaths (Natural Breaks)
Property Damage (Natural Breaks)
Crop Damage (Natural Breaks)
Flood
EQ
Hurricane Wind
Tornado
Winter
Landslide
Karst
Wildfire
Events
Pop Dens Geo Interval
Score
Definition (<)
Definition (>)
WEIGHT
Score (>=)
Hazard Risk Rank
Score (>)
Total Rank
0 Low
8.5 Med-Low
10 Med
11.5 Med-High
13 High
65 Mod.
70 High
Karst
Drought
Earthquake
Flood
FIPS
County
PV I/D PN PD CD GE EV RS Rank
51001 Accomack 2 1 2 1 1 1 1 7.5 Low | 2 1 2 1 3 1 2 10.5 Med | 2 1 2 1 1 1 1 7.5 Low | 2 1 2 1 1 4 2 13 High
51003 Albemarle 3 1 2 1 1 1 1 8 Low | 3 1 2 1 2 1 3 11 Med | 3 1 2 1 1 2 1 9.5 Med- | 3 3 2 1 2 3 3 16 High
51510 Alexandria (c) 3 1 4 1 1 1 1 9 Med- | 3 1 4 1 2 1 3 12 Med- | 3 1 4 1 1 2 1 10.5 Med | 3 1 4 1 1 4 3 15.5 High
51005 Alleghany 1 1 1 1 1 1 1 6.5 Low | 1 1 1 1 1 1 2 7.5 Low | 1 1 1 1 1 2 1 8 Low | 1 3 1 2 1 2 3 13 High
51007 Amelia 1 1 1 1 1 1 1 6.5 Low | 1 1 1 1 2 1 2 8.5 Med- | 1 1 1 1 1 2 1 8 Low | 1 1 1 1 1 3 2 10.5 Med
51009 Amherst 2 1 2 1 1 1 1 7.5 Low | 2 1 2 1 4 1 3 12.5 Med- | 2 1 2 1 1 2 1 9 Med- | 2 2 2 2 1 3 3 14.5 High
51011 Appomattox 1 1 1 1 1 1 1 6.5 Low | 1 1 1 1 4 1 3 11.5 Med- | 1 1 1 1 1 2 1 8 Low | 1 2 1 2 2 2 3 13 High
51013 Arlington 4 1 4 1 1 1 1 9.5 Med- | 4 1 4 1 2 1 3 12.5 Med- | 4 1 4 1 1 2 1 11 Med | 4 3 4 3 3 1 3 17.5 High
51015 Augusta 3 1 2 1 1 3 1 11 Med | 3 1 2 1 4 1 3 13 High | 3 1 2 1 1 2 1 9.5 Med- | 3 4 2 3 3 2 3 18.5 High
51017 Bath 1 1 1 1 1 1 1 6.5 Low | 1 1 1 1 1 1 3 8.5 Med- | 1 1 1 1 1 2 1 8 Low | 1 1 1 3 1 2 3 12 Med-
51019 Bedford 3 1 2 1 1 1 1 8 Low | 3 1 2 1 4 1 3 13 High | 3 1 2 1 1 2 1 9.5 Med- | 3 3 2 2 1 3 3 16 High
51515 Bedford (c) 1 1 3 1 1 1 1 7.5 Low | 1 1 3 1 2 1 3 10.5 Med | 1 1 3 1 1 2 1 9 Med- | 1 2 3 1 1 3 3 13.5 High
51021 Bland 1 1 1 1 1 4 1 11 Med | 1 1 1 1 4 1 2 10.5 Med | 1 1 1 1 1 3 1 9.5 Med- | 1 1 1 2 1 2 2 10 Med
51023 Botetourt 2 1 1 1 1 3 1 10 Med | 2 1 1 1 4 1 2 11 Med | 2 1 1 1 1 2 1 8.5 Med- | 2 1 1 2 1 2 3 11.5 Med-
51520 Bristol (c) 1 1 3 1 1 4 1 12 Med- | 1 1 3 1 2 1 3 10.5 Med | 1 1 3 1 1 3 1 10.5 Med | 1 1 3 1 1 3 2 11.5 Med-
51025 Brunswick 2 1 1 1 1 1 1 7 Low | 2 1 1 1 4 1 2 11 Med | 2 1 1 1 1 2 1 8.5 Med- | 2 1 1 2 1 3 2 12 Med-
51027 Buchanan 2 1 1 1 1 1 1 7 Low | 2 1 1 1 1 1 2 8 Low | 2 1 1 1 1 3 1 10 Med | 2 4 1 4 1 1 3 15 High
51029 Buckingham 1 1 1 1 1 1 1 6.5 Low | 1 1 1 1 4 1 3 11.5 Med- | 1 1 1 1 1 2 1 8 Low | 1 2 1 1 1 3 3 12.5 Med-
51530 Buena Vista (c) 1 1 3 1 1 1 1 7.5 Low | 1 1 3 1 2 1 3 10.5 Med | 1 1 3 1 1 2 1 9 Med- | 1 1 3 1 1 4 3 14 High
51031 Campbell 2 1 2 1 1 2 1 9 Med- | 2 1 2 1 4 1 3 12.5 Med- | 2 1 2 1 1 2 1 9 Med- | 2 3 2 1 1 3 3 14.5 High
51035 Caroline 2 1 2 1 1 1 1 7.5 Low | 2 1 2 1 1 1 2 8.5 Med- | 2 1 2 1 1 2 1 9 Med- | 2 1 2 1 1 4 3 14 High
51033 Carroll 2 1 1 1 1 1 1 7 Low | 2 1 1 1 4 1 2 11 Med | 2 1 1 1 1 2 1 8.5 Med- | 2 1 1 1 1 1 2 8 Low
51036 Charles City 1 1 1 1 1 1 1 6.5 Low | 1 1 1 1 2 1 2 8.5 Med- | 1 1 1 1 1 2 1 8 Low | 1 1 1 2 1 4 2 13 High
Definitions
Ranking Worksheet
I-F Data
Prop Data
Crop Data
GE
Events
PV
Population
PopDen
Ready
100%

Virginia 2010 Ranking Maps

- Illustrate data sources that could be used as part of the local plan update
- Estimation of Annualized Loss
  - Values that will be created & used in this revision will fine-tune the Virginia State Plan estimates based on better data inputs for:
    - Inclusion of 2006-2010 hazard events
    - Critical facility locations and information
    - Building/Infrastructure parameters

Figure 3.7-5: Flood Hazard Ranking Parameters and Risk Map



PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

HAZARD RANKING:

A number of factors have been considered in this risk assessment to be able to compare between jurisdictions and hazards. The factors have been added together to come up with the overall total ranking for each hazard. Some factors were weighted based on imput from the HIRA sub-committee.

Section 3.5 explains each of the factors in detail.

Factors & Weighting Include:

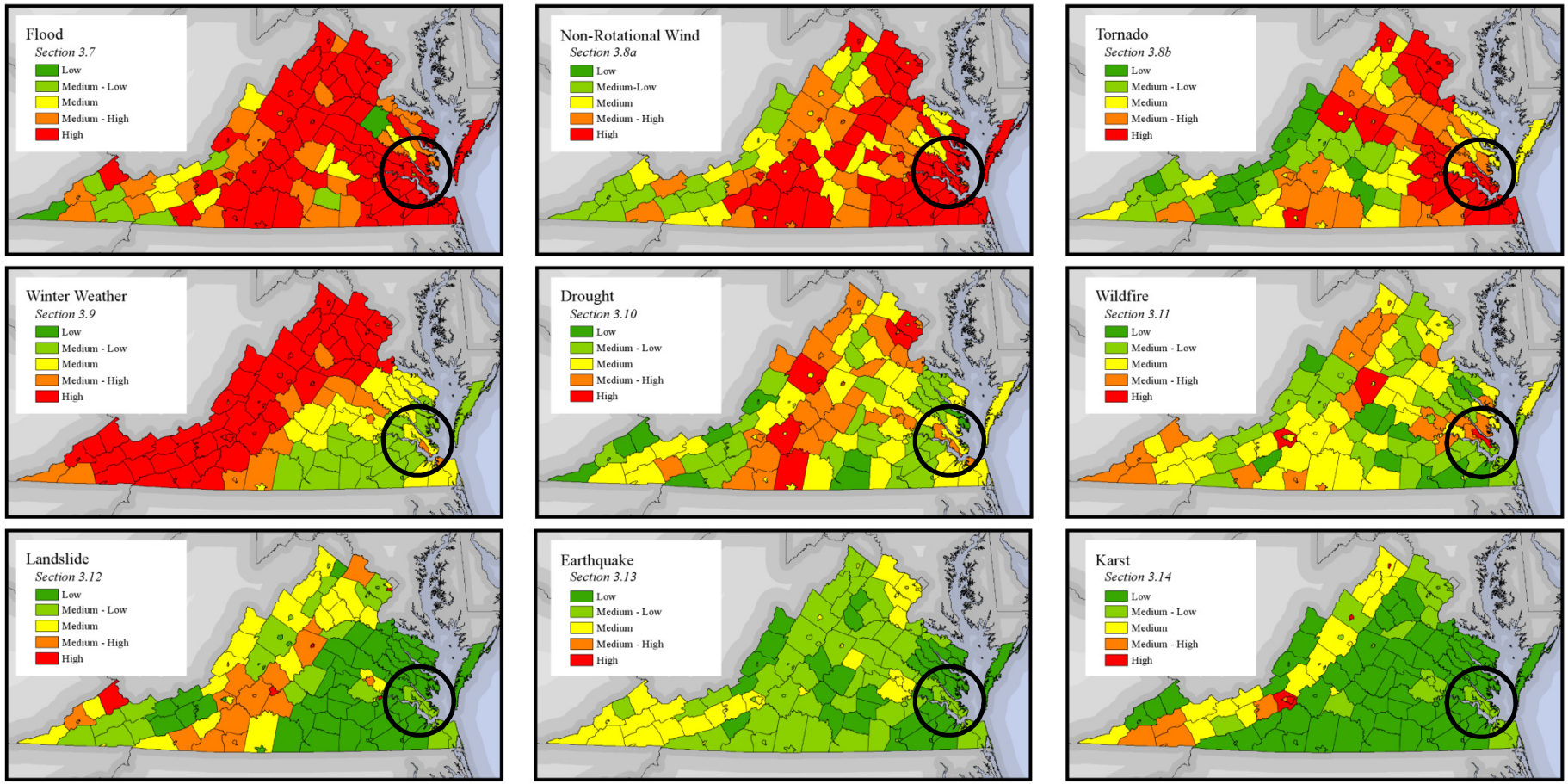
- Population Vulnerability & Density 0.5 weighting
- Injuries & Deaths 1.0 weighting
- Crop & Property Damage 1.0 weighting
- Annualized Events 1.0 weighting
- Geographic Extent 1.5 weighting

DATA SOURCES:

CGIT Ranking Methodology
VGIN Jurisdicational Boundaries
ESRI State Boundaries

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Figure 3.16-1: Hazard Ranking Risk Maps



PROJECTION:
VA Lambert Conformal Conic
North American Datum 1983

DATA SOURCES:
CGIT Ranking Methodology
VGIN Jurisdictional Boundaries
ESRI State Boundaries

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

HAZARD RANKING:
A number of factors have been considered in this risk assessment to be able to compare between jurisdictions and hazards (Section 3.5). The factors have been added together to come up with the overall total ranking for each hazard.
Hazards were then added together to determine the overall risk to the Commonwealth. Figure 3.16-3 shows the overall result.

N
W E
S

Risk Assessment

Now we know what hazards impact the region, and which ones are more prevalent, how should we determine what's At Risk (or vulnerable)?

Vulnerability Analysis & Loss Estimation

Requirement §201.6(c)(2)(ii)(B): *[The plan* ***should*** *describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate … .*

- Annualized Loss to be based on:
  - HAZUS-MH
  - NCDC Storm Events
- Building Specific Analysis for Buildings & Critical Facilities
  - *Data Dependant*
- Development Trends
  - In areas of high risk?

For Update:
Results will be summarized in tables to allow for comparison among jurisdictions

Hazard Data Availability

- National Climatic Data Center (NCDC) Storm Events Database
  - Local meteorologists submit event reports to database, following a standard reporting protocol (what to report, and how to report it)
  - Includes location and time of event, property and crop damages, injuries and deaths
  - Data may be biased by population
  - Need to process data to assign all events/damages to specific jurisdictions

- Other Hazard-Specific Data
  - VDOF
  - USGS

HAZUS-MH Scenarios

- **Level I Analysis**
  - **Nationally-developed data for building square footage, building value, population characteristics, costs of building repair and economic data (broken down by census division units)**
    - **Flood**
    - **Earthquake**
    - **Hurricane Winds**

- ***HAZUS is not required in Hazard Mitigation Plans, communities are encouraged to use HAZUS to form a scientific basis from which the mitigation strategy is developed.***

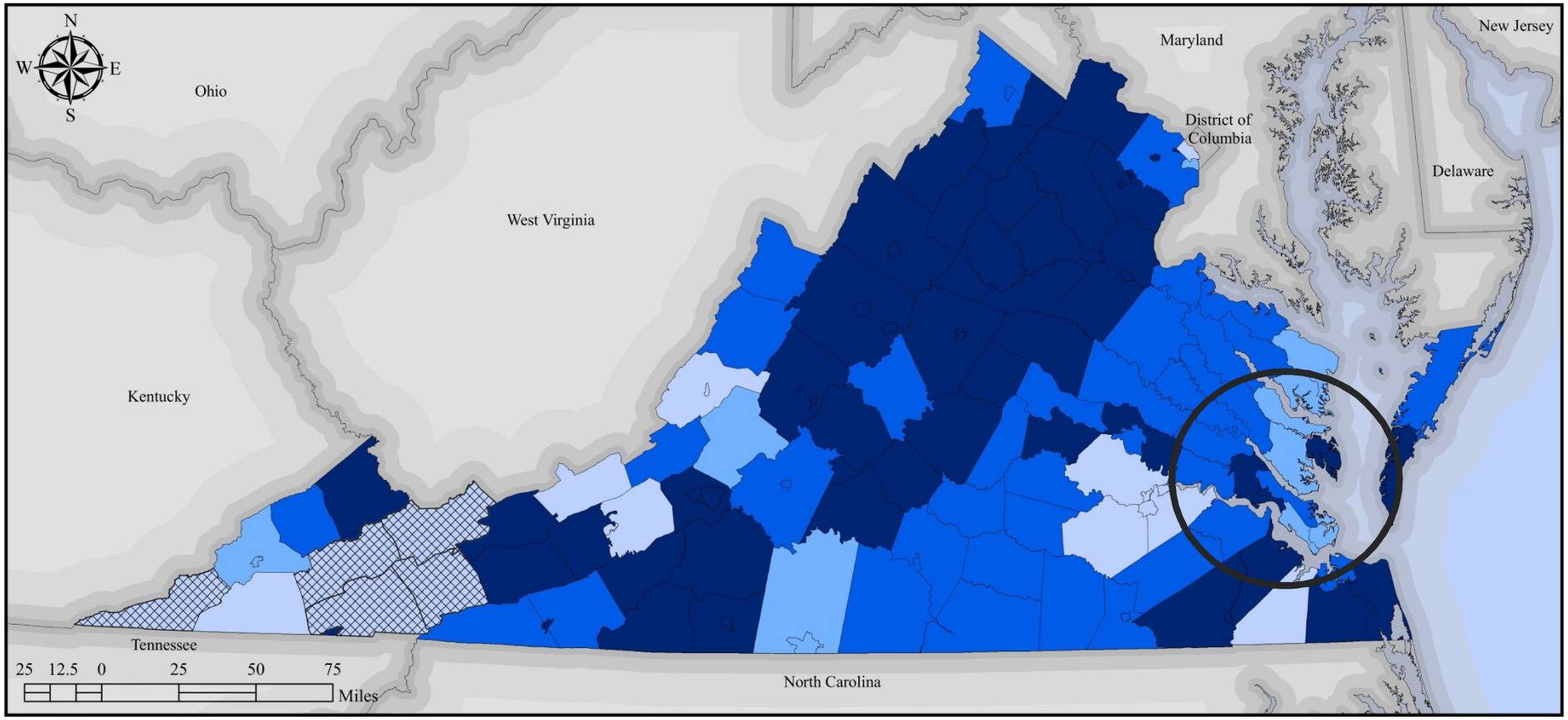
Flood

(riverine, coastal, flash, storm surge, sea level rise, tsunamis, erosion)

Coastal flooding from Isabel
Buckroe Reach, Hampton

- **Several types of flooding to be addressed**
- **2006 Vulnerability Assessment includes (for some jurisdictions) number of parcels and critical facilities in the 100-yr Floodplain**
  - **2010 Update: Based on data availability, expand analysis to include Annualized Loss.**
    - **HAZUS-MH Analysis will also be completed**
    - **Repetitive Loss Inclusion**
    - **Floodplain Mapping (DFIRMs)and Storm Surge for Geographic Extent**

Figure 3.7-1: Digital Flood Data Status



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VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

DATA SOURCES:

FEMA FMPU DFIRM Status
VGIN Jurisdicational Boundaries
ESRI State Boundaries

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

LEGEND:

Available Flood Data
- DFIRM (61 jurisdictions)
- PrelimDFIRM (41 jurisdictions)
- Q3 (13 jurisdictions)
- Digitized (14 jurisdictions)
- No Digital FIRMs Available (5 jurisdictions)

Status as of 01/31/2009

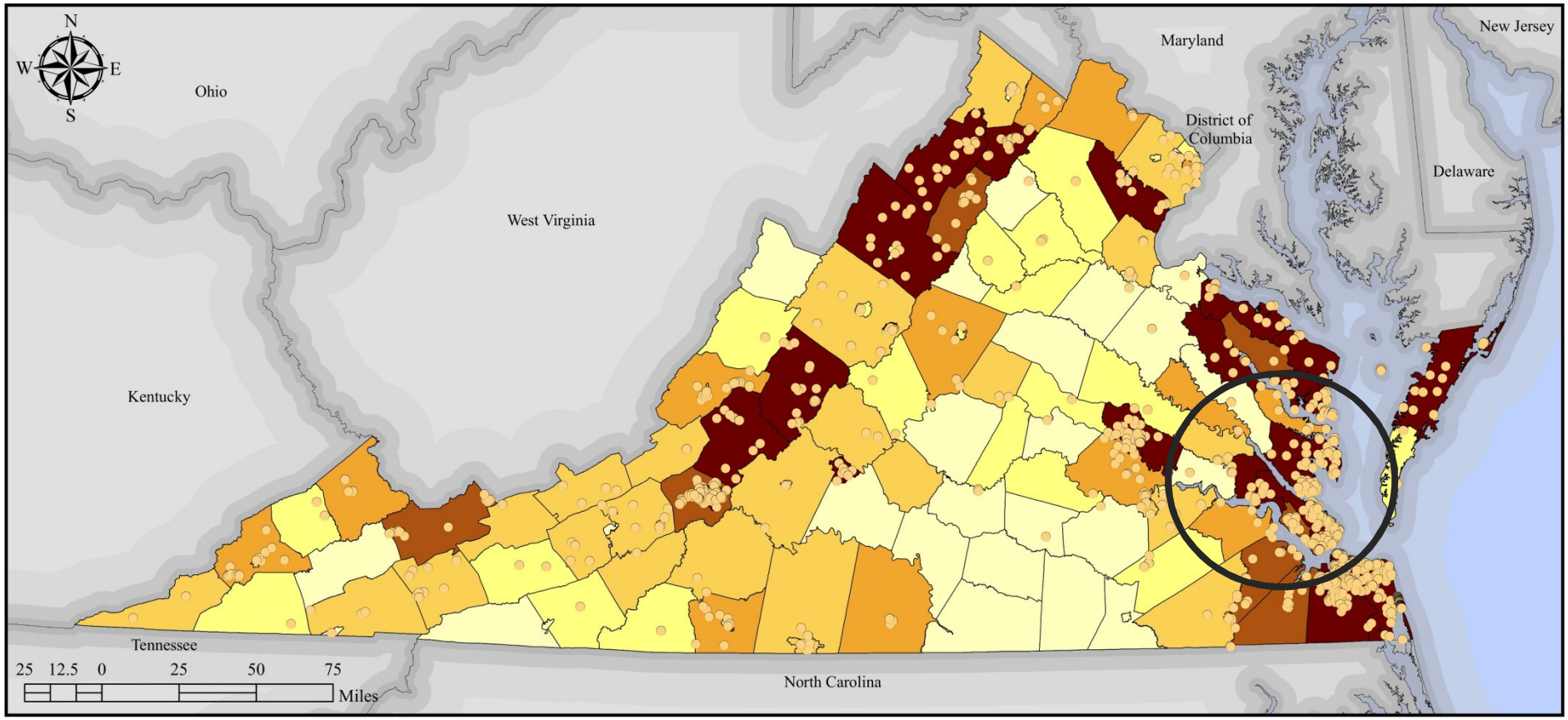
HAZARD IDENTIFICATION:

Digital Flood Data Status illistrates the best available data for each jurisdiction. FEMA Region III has provided preliminary data for 41 localities.

The preliminary maps are not final and are to be used for this hazard mitigation plan only.

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Figure 3.7-2: Non-Mitigated Repetitive Loss Structures



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DATA SOURCES:

FEMA Region III Flood Claims
VGIN Jurisdicational Boundaries
ESRI State Boundaries

LEGEND:

RLS Total Loss Paid
- No Claims
- < $125,000
- $125,000 - $500,000
- $500,000 - $1M
- $1M - $1.5M
- > $1.5M

RL Structures

Repetitive Loss Properties from 7/1/2008

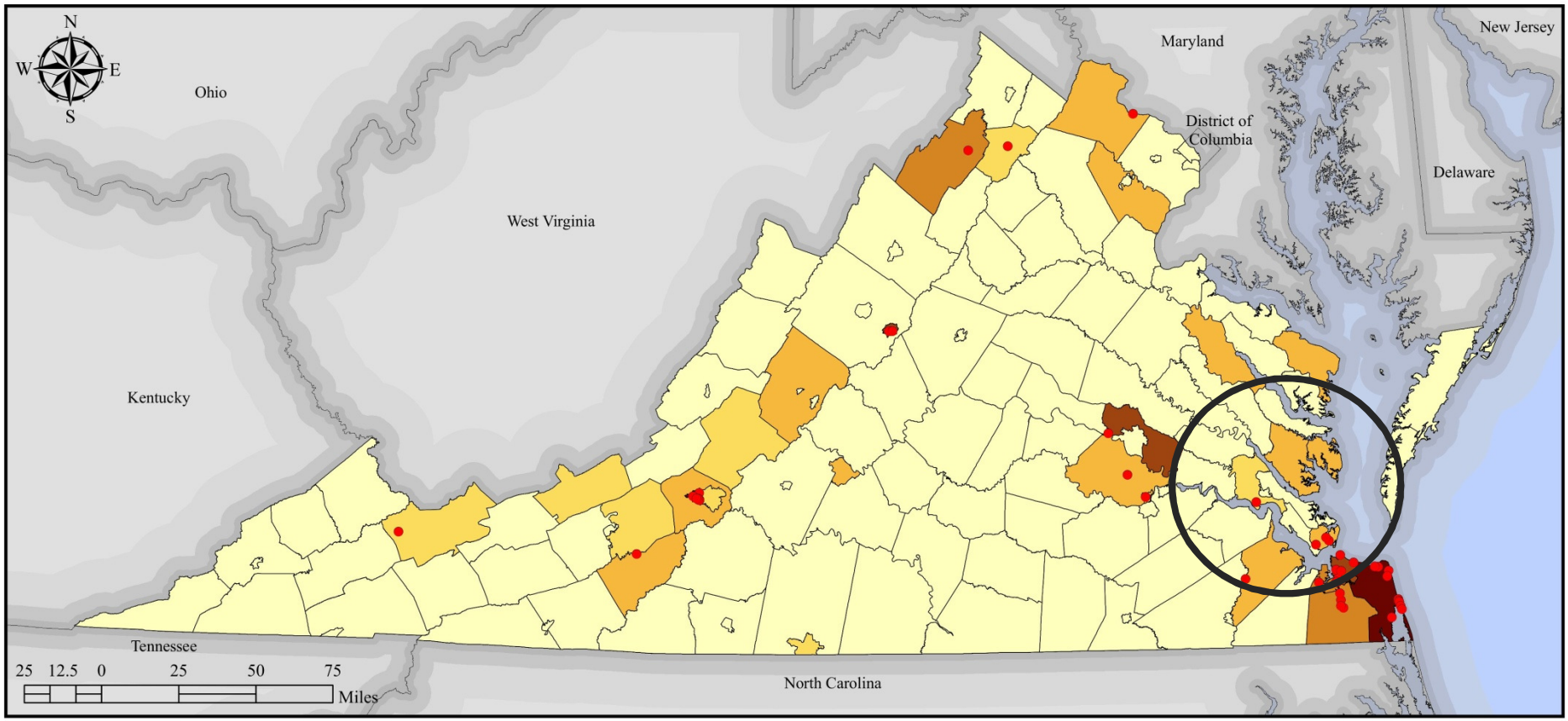
HAZARD IDENTIFICATION:

A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A Severe Repetitive Loss (SRL) property has at least four NFIP claim payments over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Figure 3.7-3: Severe Repetitive Loss Structures



DATA SOURCES:

FEMA Region III Flood Claims
VGIN Jurisdicational Boundaries
ESRI State Boundaries

LEGEND:

SRL Total Loss Paid
- No Claims
- < $100,000
- $100,000 - $250,000
- $250,000 - $500,000
- $500,000 - $1 Million
- > $1 Million

SRL Structures

Severe Repetitive Loss Properties from 4/30/2008

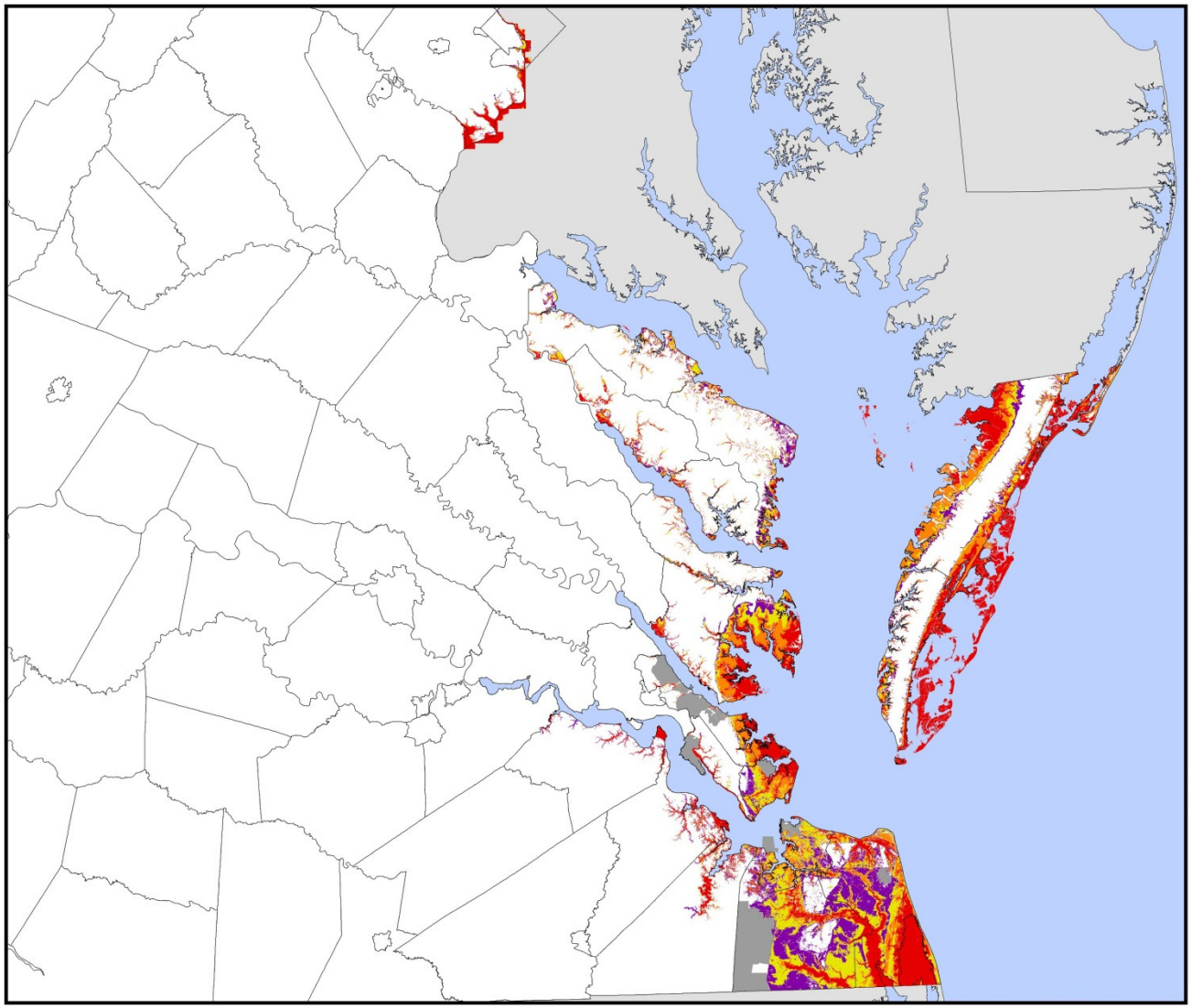
HAZARD IDENTIFICATION:

A Severe Repetitive Loss (SRL) property has at least four NFIP claim payments over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Figure 3.7-6: Storm Surge Categories



Storm Surge Categories

- Category 0: 60 - 73 mph
- Category 1: 74 - 95 mph
- Category 2: 96 - 110 mph
- Category 3: 111 - 130 mph
- Category 4: 131 - 155 mph

N W E S

RISK ASSESSMENT:

Data is from the 2008 Update to the Virginia Hurricane Evacuation Study (VHES). Statewide digital storm surge inundation zone dataset was created from 2003-2008 by the US Army Corps of Engineers.

DATA SOURCES:

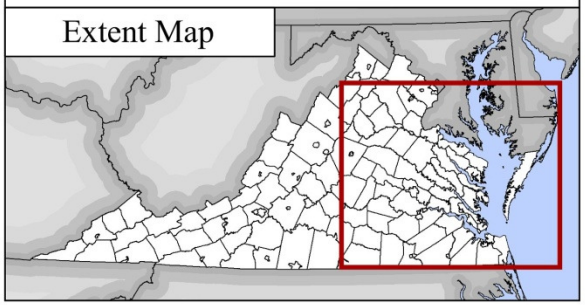
US Army Corps of Engineers: SLOSH Model
VGIN Jurisdicational Boundaries
ESRI State Boundaries

10 5 0 10 20 30 Miles

PROJECTION:

VA Lambert Conformal Conic North American Datum 1983

Extent Map

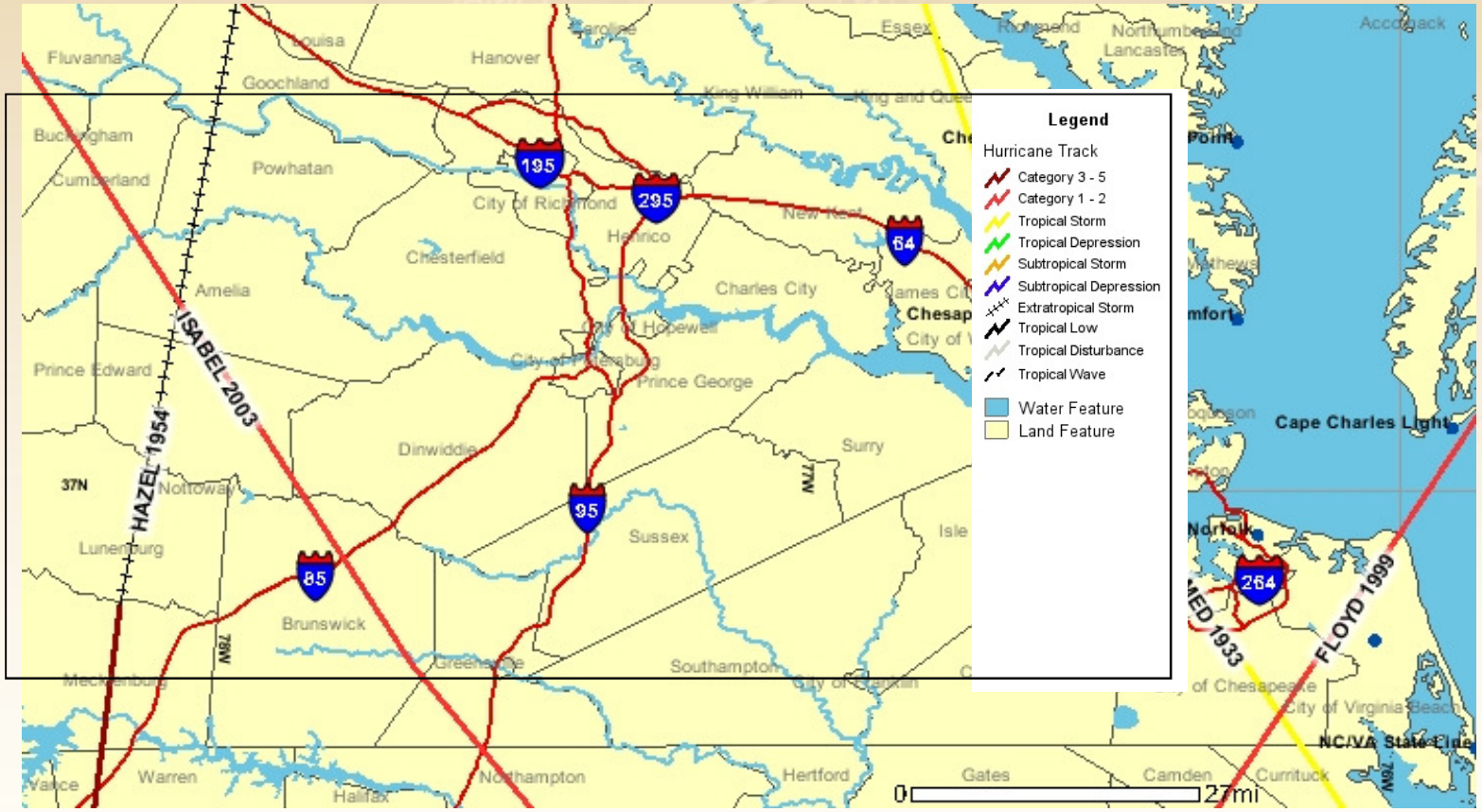


DISCLAIMER: The majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to natural hazards. In order to identify potential risk in the Commonwealth the available data has been used beyond the original intent.

High Winds & Hurricane/Tropical Storms

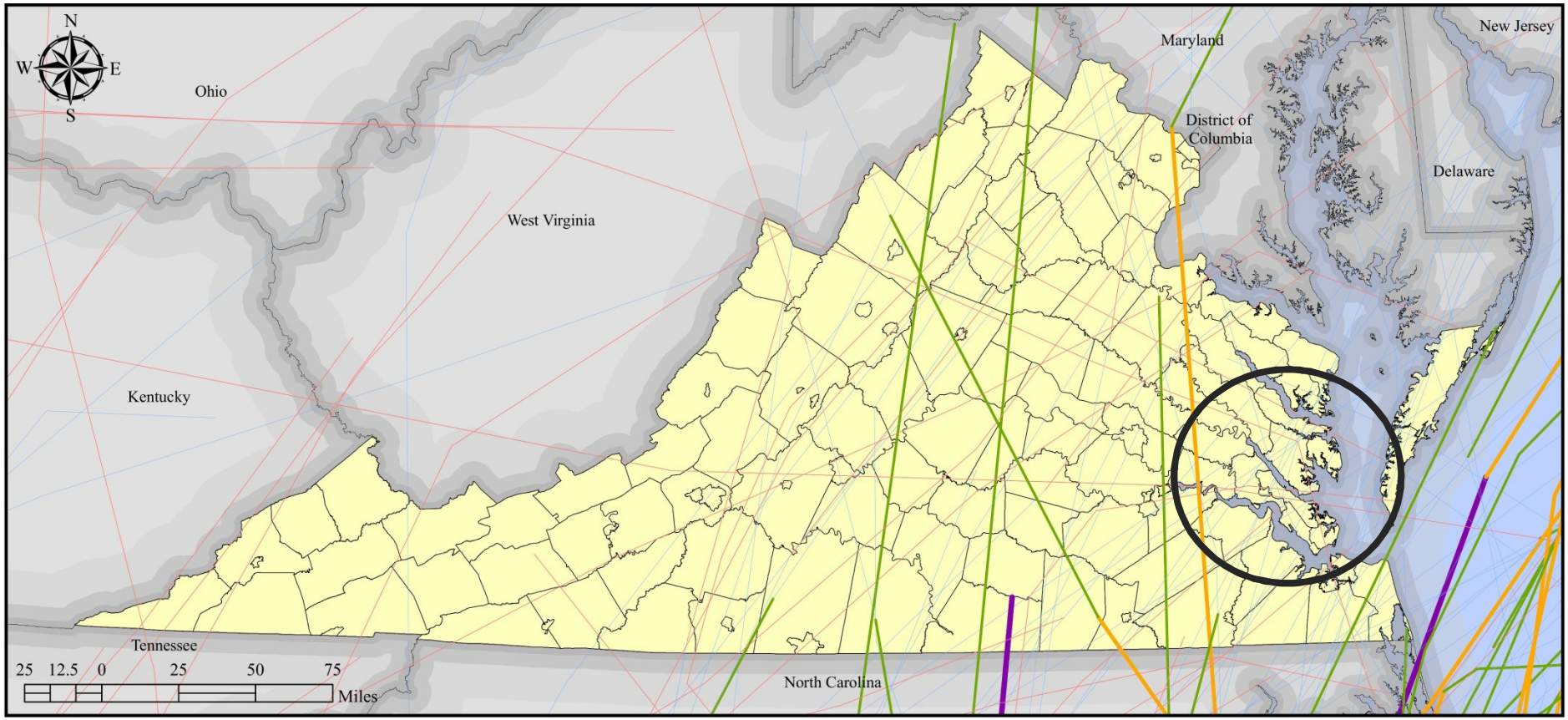
- 2006 Vulnerability Assessment includes HAZUS wind analysis (probabilistic) but no annualized loss
  - 2010 Update: Based on data availability, expand analysis to include Annualized Loss.
    - HAZUS-MH Analysis will also be completed
    - Wind zone Mapping for Geographic Extent

Figure 4.1.3 -Significant Tropical Storm Systems, Virginia Peninsula (from 2006 HMP)



Source: NOAA CSC Hurricane Mapping Tool

Figure 3.8a-2: Tropical Cyclone Activity in Virginia 1851-2008



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DATA SOURCES:

NOAA Hurricane Tracks
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:

Saffir-Simpson Hurricane Categories
Tropical Depression (17-38 mph)
Tropical Storm (39-73 mph)
Category 1 (74-95 mph)
Category 2 (96-110 mph)
Category 3 (111-130 mph)

HAZARD IDENTIFICATION:

Map shows all the hurricane tracks in or around Virginia from 1851-2008.

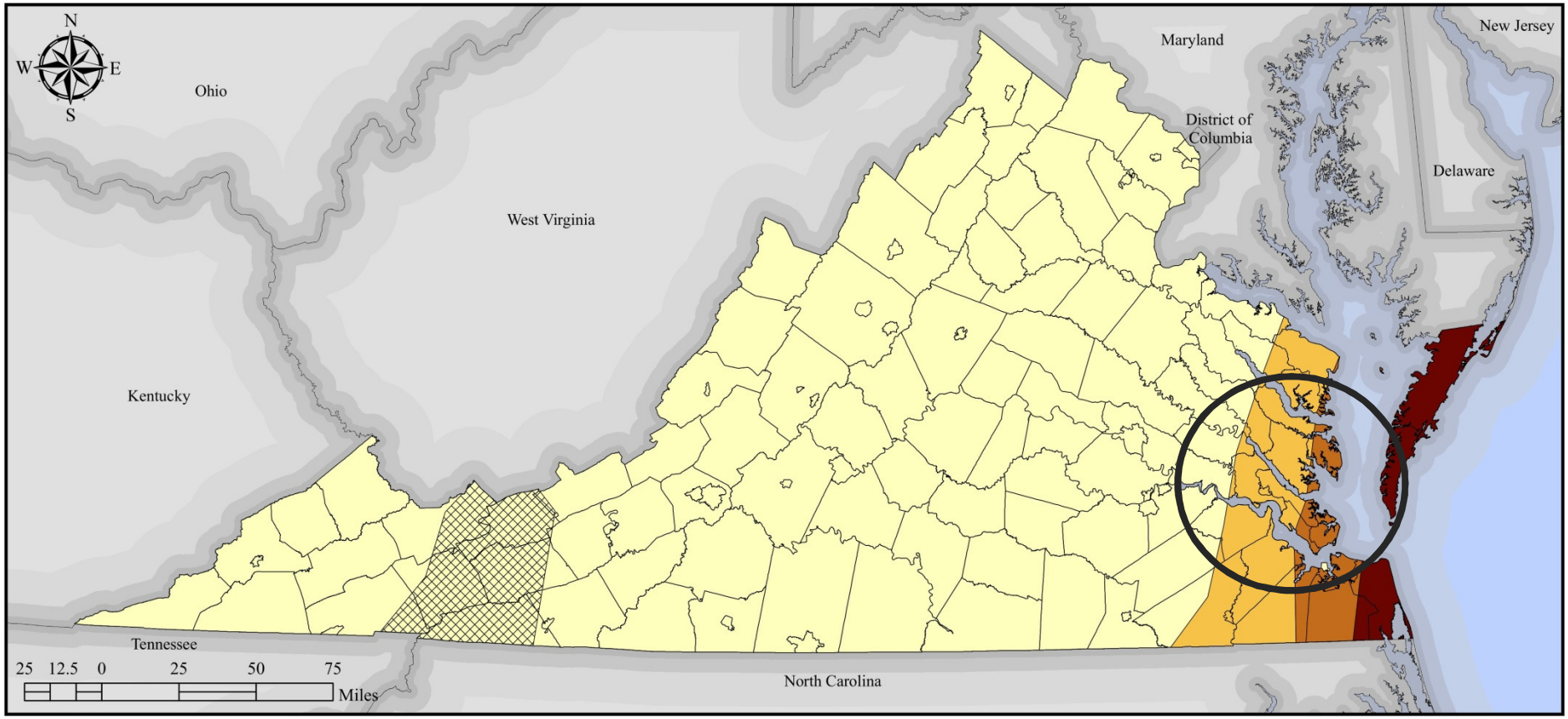
NOAA provided the locations and categories of all hurricanes from 1851-2007. Data for 2008 is approximate and was obtained from Stormpulse.

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Wind Speeds

Figure 3.8a-3 ASCE Design Wind Speeds



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VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

DATA SOURCES:

ASCE 7-98 Design Wind Speeds
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:

Wind Speeds for 3-Second Gust
- < 90 mph
- 90-100
- 100-120
- > 120 mph
- Special Wind Region

HAZARD IDENTIFICATION:

ASCE basic wind speeds are based on nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet (10m) above ground for the 50-year recurrence interval (2% annual probability). Values have been determined by localized research using approved probabilistic methods.

Special Wind Regions are areas of unusual wind conditions.

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Tornado

- **2006 Vulnerability Assessment refers to the same areas that are exposed to hurricanes are at risk for tornado**
  - **2010 Update: Based on data availability, expand analysis to include Annualized Loss.**
    - **Incorporate Commonwealth of Virginia's HIRA tornado analysis**

Tornado

Appendix B:
Peninsula Reported Tornado Tracks, 1950-2002 Magnitude F1 or Greater

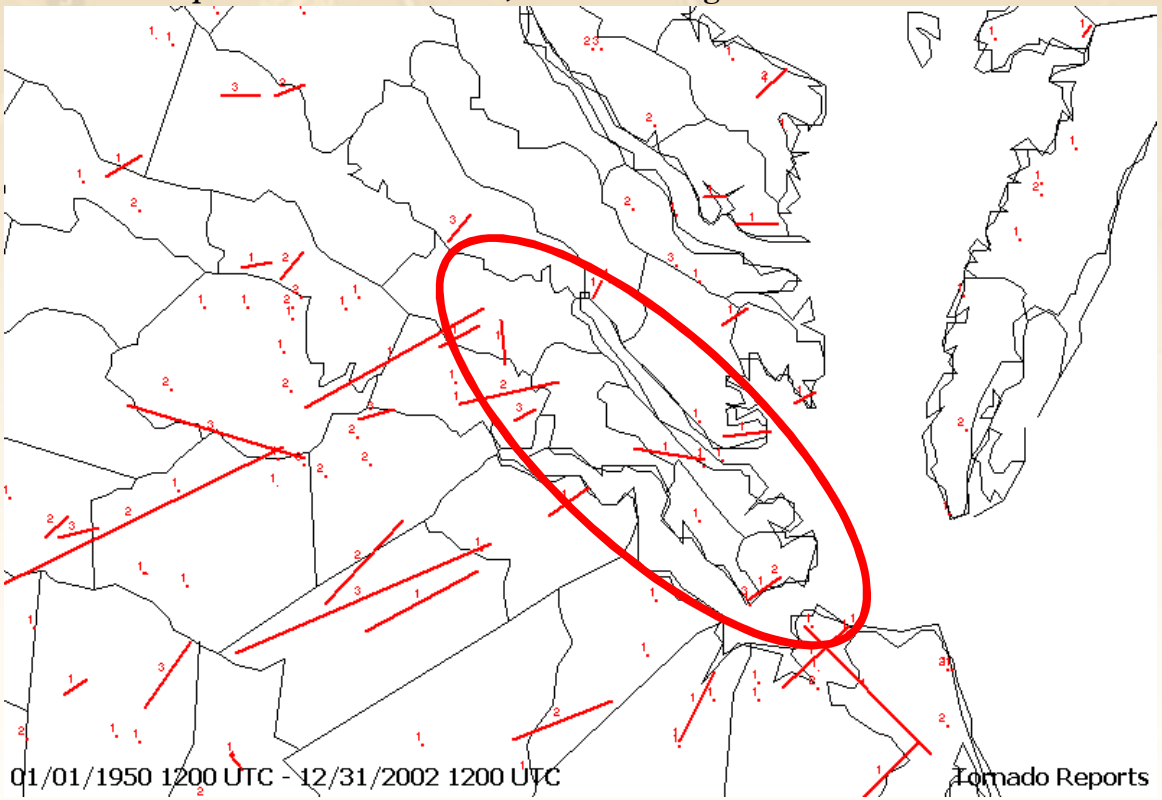
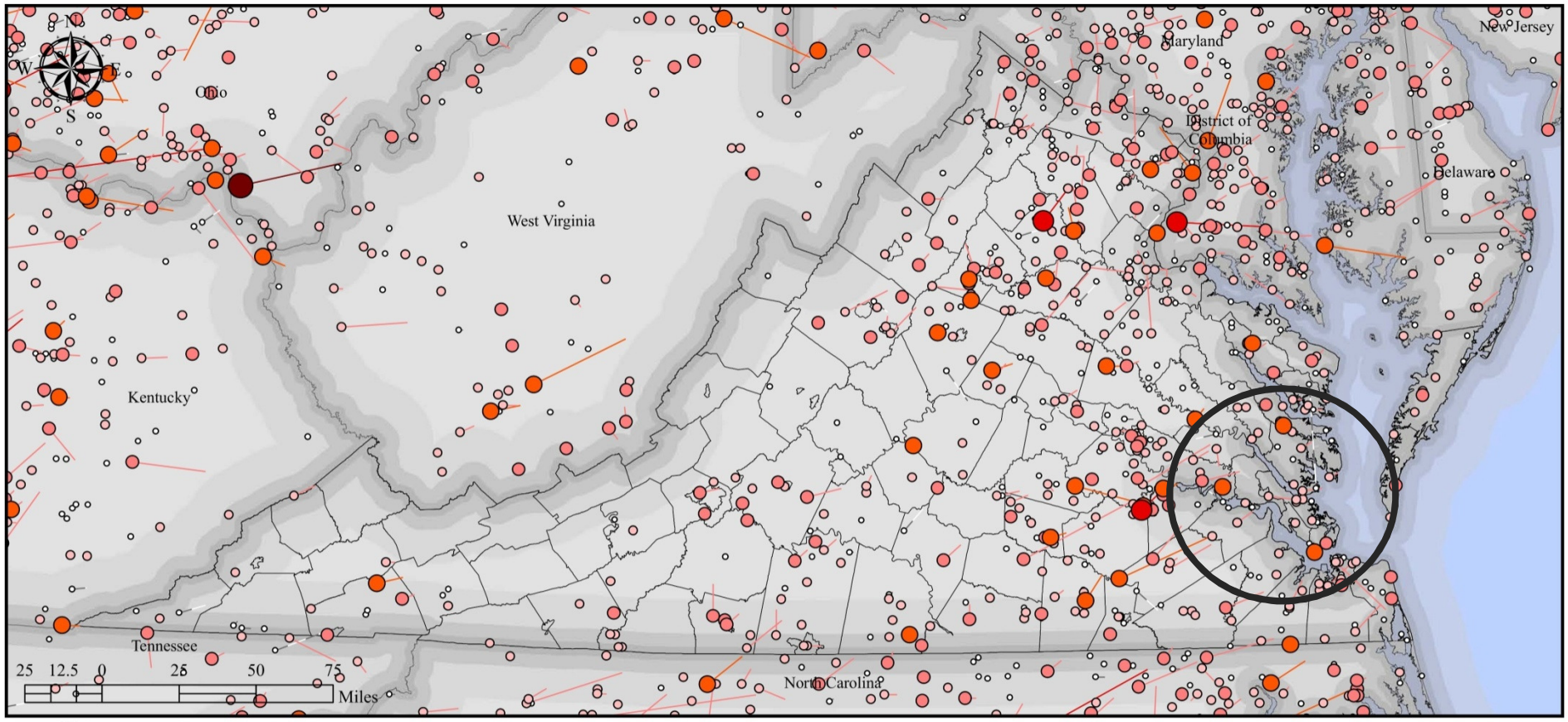


Figure 3.8b-1: Historic Tornado Touchdowns and Tracks: 1950 - 2006



CGIT Center for Geospatial Information Technology

VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

DATA SOURCES:

SVRGIS
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:

Tornado F-Scale
0
1
2
3
4
5

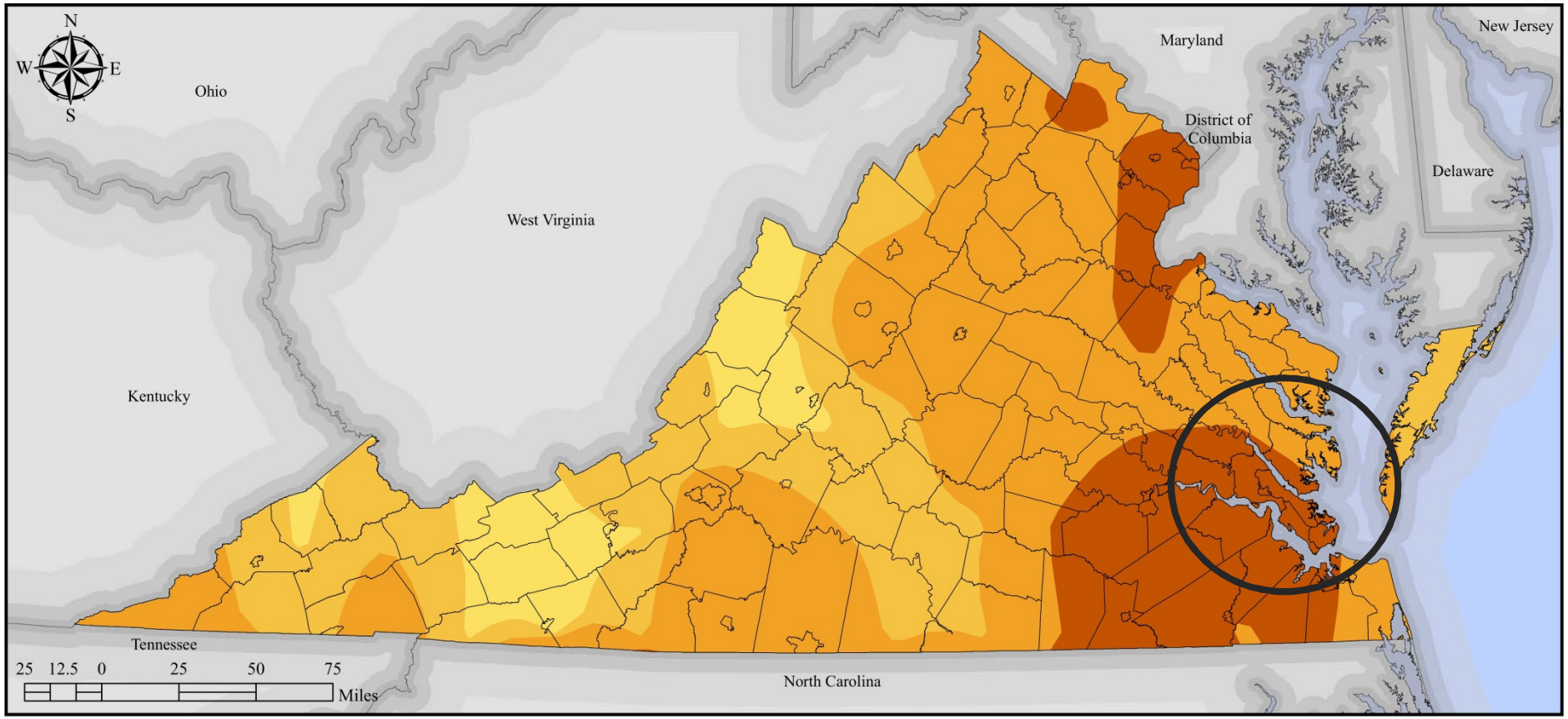
HAZARD IDENTIFICATION:

Historic tornado touchdowns and tracks are symbolized for visual effect and are not drawn to scale. Actual tornado swath widths vary considerably, although more intense tornadoes are generally wider.

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Figure 3.8b-3: Tornado Hazard Frequency



DATA SOURCES:

SVRGIS / SeverePlot
VGIN Jurisdicational Boundaries
ESRI State Boundaries

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

LEGEND:

Annual Tornado Hazard Frequency
Times One Million

0 - 1.25	Low
1.251 - 10	Medium-Low
10.1 - 100	Medium-High
100.1 - 316	High

HAZARD IDENTIFICATION:

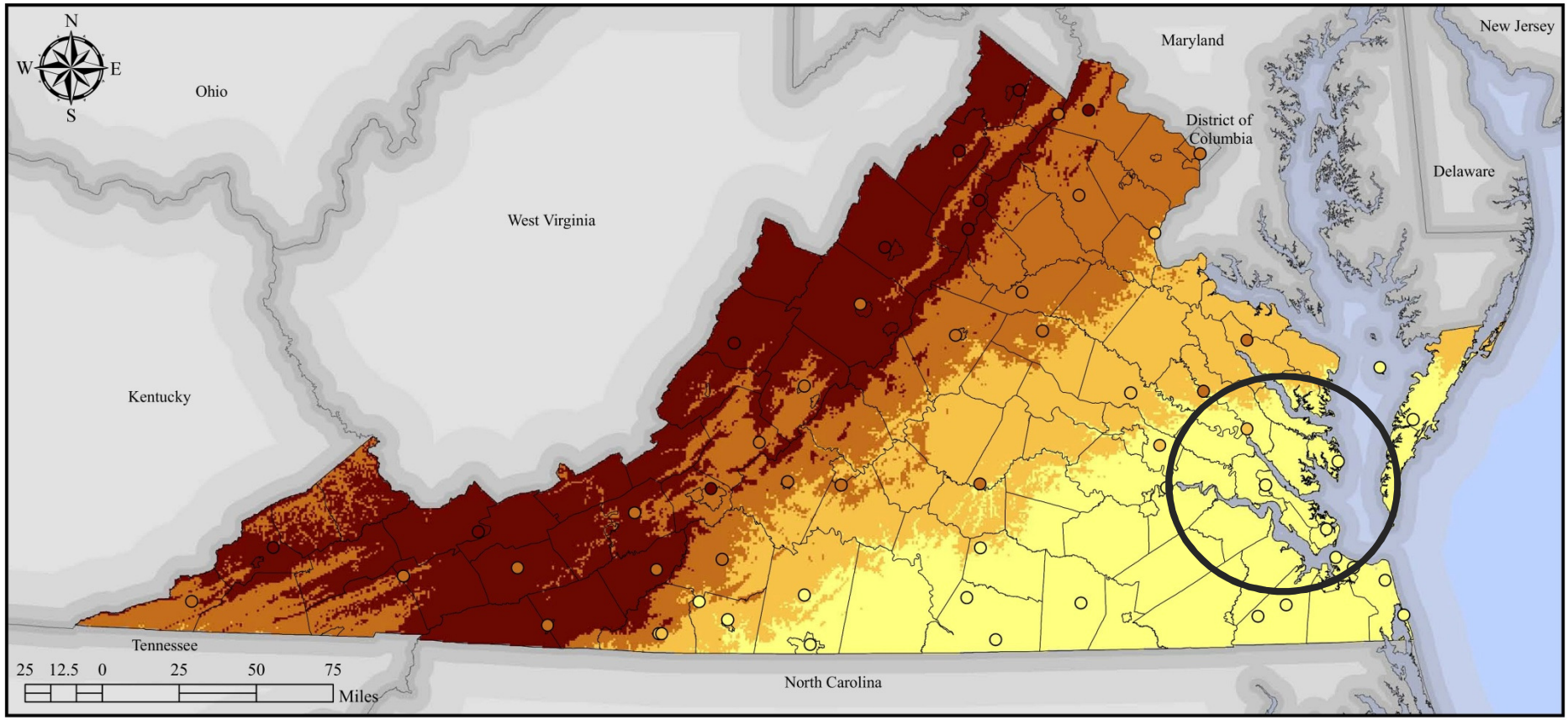
Annual tornado hazard frequency is an estimate of the frequency with which a point will experience a tornado, interpolating from neighboring tornado impact areas over the period of record. This map shows hazard frequency of any intensity of tornado. Note that "high" frequency in the state of Virginia is still rather low in comparison to many midwestern and southern states.

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Winter Weather

- 2006 Vulnerability Assessment did not include Winter Weather
  - 2010 Update: Based on data availability, expand analysis based on Virginia HMP analysis/results using weather station data
    - NCDC Storm Events Data
    - NCDC Weather Station Data

Figure 3.9-2: Average number of days with at least 3 inches of snow



DATA SOURCES:

CGIT analysis of NCDC data
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:

Avg. Number of Days per Year

- 1.5 or lower
- 1.51 - 2.0
- 2.01 - 3.0
- 3.01 - 6.72

HAZARD IDENTIFICATION:

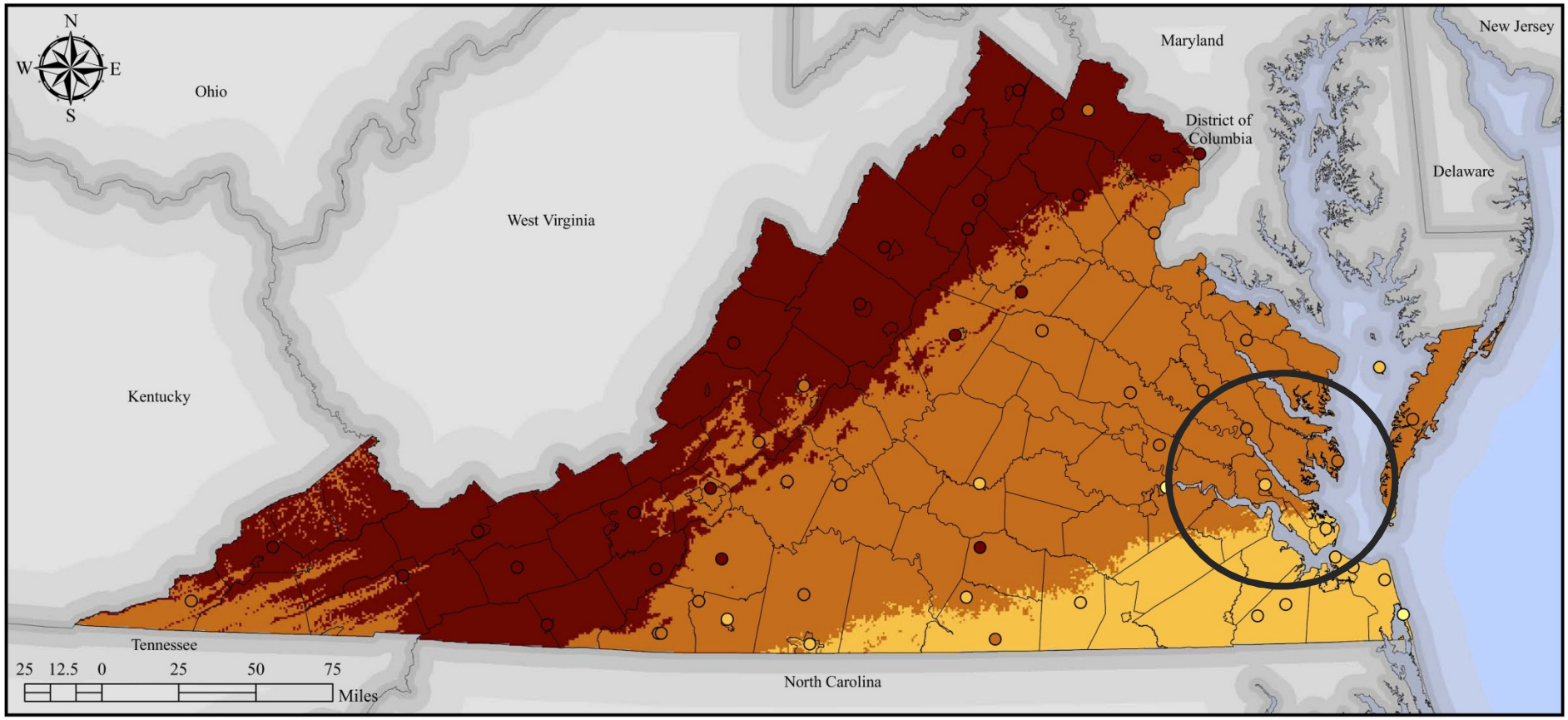
Winter weather statistics were estimated from daily NCDC weather station reports from 1960 - 2000; the values at the weather stations are symbolized with small round dots, and a statewide regression fit depicts the overall trend in the weather station statistics.

These results depict general trends, and local conditions may vary widely.

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Figure 3.9-5: Frequency of 5 or more days entirely at or below 32 F



DATA SOURCES:

CGIT analysis of NCDC data
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:

Avg. Annual Frequency

- 0 - 0.25
- 0.251 - 0.5
- 0.51 - 0.75
- 0.751 - 1

HAZARD IDENTIFICATION:

Winter weather statistics were estimated from daily NCDC weather station reports from 1960 - 2000; the values at the weather stations are symbolized with small round dots, and a statewide regression fit depicts the overall trend in the weather station statistics. Average annual frequency ranges from zero to one: zero means that the condition never occurs in a year, one means that it always occurs in a year. These results depict general trends, and local conditions may vary widely.

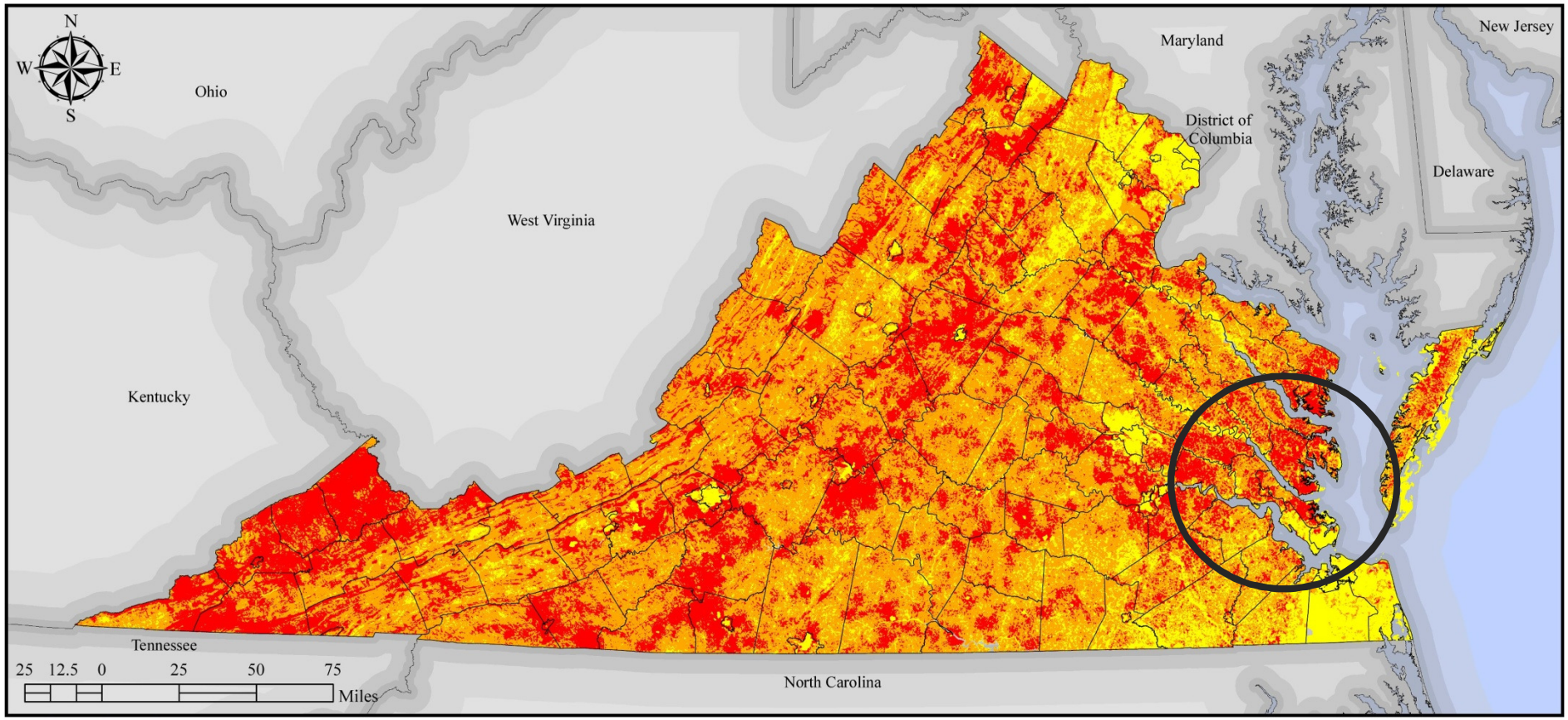
PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Wildfire

- **2006 Vulnerability Assessment includes information from VDOF wildfire incidents and parcels within the high risk zone.**
  - **2010 Update: Based on data availability, expand analysis to include Annualized Loss.**
    - **VDOF Risk Assessment Mapping for Geographic Extent**

Figure 3.11-1: VDOF Statewide Wildfire Risk Assessment



Center for Geospatial Information Technology

VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

DATA SOURCES:

VDOF Wildfire Risk Assessment
VGIN Jurisdicational Boundaries
ESRI State Boundaries

LEGEND:

Wildfire Risk
- None (Water)
- Low
- Moderate
- High

HAZARD IDENTIFICATION:

Wildfire Risk Assessment model has been developed by the Virginia Department of Forestry. This model aims to identify areas which are more favorable to wildfire occurence and wildfire advancement.

Model inputs included: historical fire incidents, land cover (fuels surrogate), topographic characteristics, population density, and distance to roads.

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Updates to Risk Assessment:
Next Steps…

- Data Collection for Hazards & Critical Facilities
- Collection of Development and Land Use planning documents
- Inclusion of disasters/events since 2006 plan
- Conduct Hazard & Vulnerability Analysis
  - Ranking Methodology based on Available Data
  - Loss Estimation
  - Alignment/Refinement with Virginia State Plan HIRA
  - HAZUS-MH Analysis
- Map generation & Report writing
  - Re-organization of HIRA section for better readability

Problem Areas and Historical Occurrences

Steering Committee Questions to Answer:

- ***What are your major concerns?***
- ***What events have occurred?***
- ***What events do you think are likely to occur?***
- ***What specific vulnerabilities exist?***
- ***What specific information can you provide?***

Data Transfer to Dewberry

A secure FTP Site has been setup for this project:

ftp.dewberry.com

Username: PHMPhmp

Password: 5X25X2

- **See DATA MATRIX for general types of data that would be beneficial for the HIRA.**
- **Problem Areas & Historical Occurances**
- **GIS & Hazard Specific contacts**
- **Data used in previous planning efforts & other plans**

COMPLETED FORMS TO:

Rachael Herman

716-949-6327

rherman@dewberry.com

PICTURES OF PAST EVENTS/DAMAGES

HIRA Placeholder

Human-Caused Hazards

- Infrastructure failure, crime and terrorism:
  - 1) description;
  - 2) historical occurrence;
  - 3) spatial review of at-risk area; and
  - 4) discussion of future event probability.
- Per VDEM classifications:
  - Accident
  - Crime
  - Terrorism

Mitigation Goals, Objectives & Projects

- Inventory and assess status of 2006 mitigation actions
- Develop regional goals and projects by Steering Committee
- Facilitate development of jurisdiction-specific goals and projects
- Create mitigation strategy tracking tool for use over next 5 years

Plan Production and Adoption

- Circulate drafts early and often via Share Point and ftp site
- Submit completed plan with crosswalk to VDEM
- Provide adoption resolution templates
- Compile adoption notices and submit full plan to VDEM (Robbie Coates) and FEMA

Value Added Service

- Address non-traditional hazards like climate change
- Scope highest priority projects
  - Project Description
  - Feasibility Analysis
  - Benefit Cost Analysis
  - EHP Review
- Public Outreach website

Problem Areas and Historical Occurrences

- Questions to answer
  - What are your major concerns?
  - What events have occurred?
  - What events do you think are likely to occur?
  - What specific vulnerabilities exist?
  - What specific information can you provide?

Public Outreach Website

- Visioning:
  - How do you want to interact with your publics
    - Internal local government
    - Citizens
    - Specific External Organizations
  - What does the external website need to accomplish? (Resource Stack & group brainstorming)

What do you want to accomplish through Outreach (group brainstorming)

What do you want to accomplish through Outreach (group brainstorming)

What do you want to accomplish through Outreach (group brainstorming)

What do you want to accomplish through Outreach (group brainstorming)

What do you want to accomplish through Outreach (group brainstorming)

Define external website needs. What should it accomplish? (Resource Stack & group brainstorming)

Next Steps

- Schedule for periodic conference calls
  - HIRA
  - General Plan Update process
- Data gathering for HIRA
- Draft HIRA Review – January
- Initiation of Public Website
- Reporting on 2006 Plan Accomplishments
- Data gathering for HIRA

Peninsula Kick-off

Peninsula Mitigation Plan Update Kick Off Meeting
September 20, 2010 Sign-in Sheet

Name	Department/Organization	Phone	Fax	E-mail
Victor J	Newberry	757-469-1882		victortj@yahoo.com
Shaffer C	Hampton EM	757 727 6067		cshaffer@hampton.gov
Sara Ruch	Hampton EM	757-262-7304		sruch@hampton.gov
Tracy Hanger	Hampton Fire	757-727-2288	757-727-6094	thanger@hampton.gov
Deborah Mills	Dewberry	703·749.0162		dmills@dewberry.gov
TAL LUTON	James City County	757 565 7605		HLUTON@JAMES-CITY.VA.US
Natalie Easterday	HRPDC	757-420-8300		neasterday@hrpdcva.gov
Richard Flannery	HRPDC	420-8300		RFLANNERY@HRPDCVA.GOV
R. Paul Long	York Co.	890-3600		Longr@yorkcounty.gov
S. Kopczynski	York Co	890-3600		Kopczyns@yorkcounty.gov
Ken Jones	Newport News	269-2400		KJONES@NNGOV.COM

Peninsula
Hazard Mitigation Plan Update

HIRA Presentation

January 28, 2011

Dewberry

NRW Engineering, P.C.
Consulting Structural Engineers

RESOURCE STACK, INC.

Meeting Agenda

1. Welcome, Introductions and Agenda
2. Hazard Identification and Risk Assessment
3. Human Caused Hazards Analysis
4. Review and Validation of the 2006 Plan Goals and Action Strategy
5. Next Steps:
   - Local Plan Committee Scheduling
   - Project Schedule
   - Remaining Local Inputs Required
     - 2006 Evaluation
     - Capability Analysis

Dewberry Team

Project Manager	Deborah Mills	703.849.0162 804.335.9946 (c)	dmills@dewberrry.com
HIRA Lead	Ryan Towell	703-849-0275	rtowell@dewberry.com
Planning Lead	Carrie Speranza	703.849.0367	csperanza@dewberry.com
Mitigation Strategies Lead	Carrie Gonzalez	703.849.0154	cgonzalez@dewberry.com

- Public Web Site Preview

Hazard Mitigation

Mitigation plans form the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. - Federal Emergency Management Agency

Sunday, January 23, 2011

Peninsula

Peninsula

Login | Register

Public awareness is a key component of an overall mitigation strategy aimed at making a home, neighborhood, school, business or city safer from the effects of natural hazards.

- Peninsula Hampton Roads Hazard Mitigation Plan

Public Comment

First Name*

Last Name*

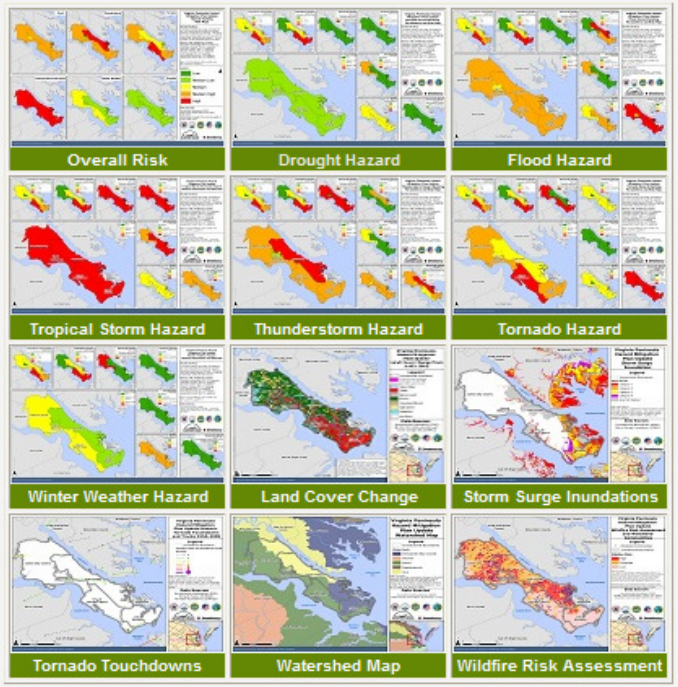
City/County*

Hampton

Comment*

Submit

Virginia Peninsula Hazard Mitigation Plan Update



The Peninsula Hazard Mitigation Plan, approved on September 28, 2006, is undergoing a five-year update. The first step is a re-evaluation of the region's natural and human-caused hazards. Please look at the posted draft maps and tell us what you think by clicking on the comment section to the left.

Want more information? Check your local emergency management website.

City of Hampton

City of Newport News

City of Williamsburg

York County

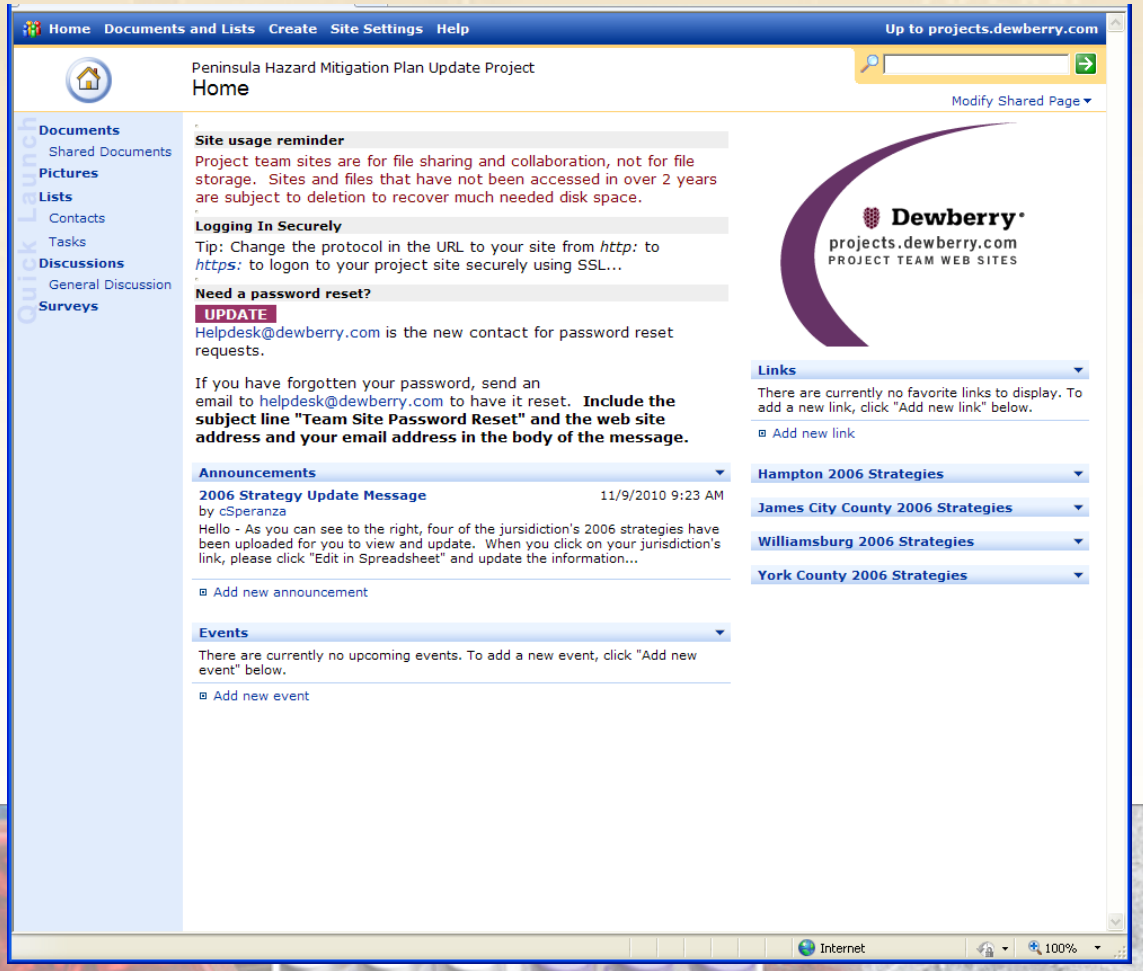
James City County

Check out the calendar page for information on upcoming public meetings.

Reviewing HIRA

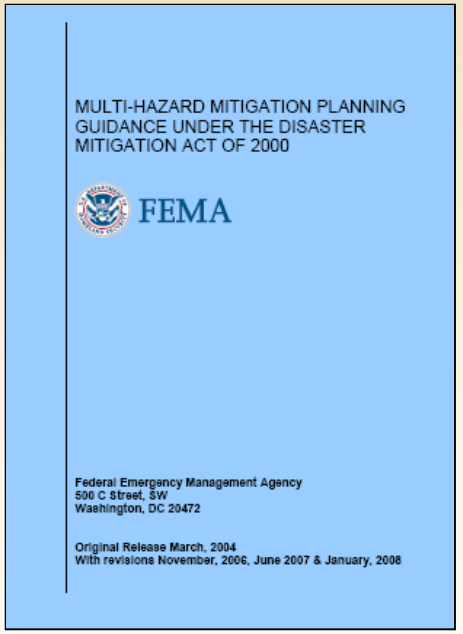
via SharePoint

- **http://projects.dewberry.com/PHMP**
- Requires:
  - **Username**
  - **Password**



HIRA: Hazard Identification & Risk Assessment

- **Purpose:** Provides a factual basis for prioritizing hazard mitigation activities
- **Major components:**
  - Identify and profile natural hazards
  - Describe vulnerability to jurisdictions and estimate potential losses
  - Assess Vulnerability to Repetitive Loss properties
  - Describe vulnerability to critical facilities, and estimate potential losses
  - Describe land use and development trends



2011 HIRA Update

Consolidates, updates, and streamlines content from the 2006 plan.

Significant changes include:

- standardizing terminology and reformatting (in order of FEMA crosswalk);
- use of a new, GIS-based ranking methodology (derived from Commonwealth hazard mitigation plan) that assesses hazard risk by jurisdiction;

2011 HIRA Update

- New analyses for all major hazards which included:
  - refreshing the hazard profile;
  - updating the previous occurrences;
  - determining annualized number of hazard events and losses by jurisdiction using NCDC and other data sources where available;
  - updating the assessment of risk by jurisdiction based on new data;
  - updating the assessment of risk by jurisdiction based on new data.
- New maps and imagery.

Hazard Identification

- Multiple hazards impact the Peninsula; how do we determine priority hazards?
  - Previous Hazard Mitigation Plan (2006)
  - Declared Disasters
  - Availability of Data (NCDC, Other sources)

Hazards Addressed:

Flood (Sea Level Rise, Erosion, Tsunami, Dam Failure)
Winter Storms (Nor'easters)
Significant Thunderstorms (wind, hail, lightning)
Tornadoes
Hurricanes & Tropical Storms
Drought (Extreme Heat)
Wildfire
Earthquakes
Dam Failure
Landslides & Expansive Soils
Biological/Epidemics
Human-Caused

Background Data

- Population
- Climate Change
- Land Use and Development
- Local Zoning
- Critical Facilities
- Building Inventory
- Utility Data
  - Hampton Roads Sanitation District
  - Newport News Waterworks
  - National databases
- Disaster Data/Hazard Events
  - Federally Declared
  - NCDC
  - Other Sources (VDOF, USGS, FEMA, CDC)

Population

- Primary measure of vulnerability in the hazard ranking system.
- Hazards affecting populated areas have greater impact than hazards affecting uninhabited areas.
- Data for:
  - *2010 Census Bureau Population and Population Density Estimates*
  - *Population Projections and Change (Weldon-Cooper)*
  - *Land Use trends were briefly assessed at a broad scale, noting areas of significant urbanization*

r1

Slide 11

r1 Maps do not exist as of now; may be included in Carrie's section !!
rtowell, 1/4/2011

Population

Regional Population Statistics						
Jurisdiction	Census Data		% change 1990 – 2000	2009 estimate (Weldon-Cooper)	% change 2000 to 2009	2030 Population Projection (Weldon-Cooper)
	1990	2000				
City of Hampton	133,793	146,437	9.5%	144,749	-1.15%	144,650
City of Newport News	170,045	180,150	5.9%	182,591	1.35%	183,372
City of Williamsburg	11,530	11,998	4.1%	13,572	13.12%	14,159
James City County	34,859	48,102	38.0%	63,696	32.42%	100,294
York County	42,434	56,297	32.6%	65,964	17.17%	86,823
Total	**392,649**	**442,984**	**12.8%**	**470,572**	**6.23%**	**529,298**

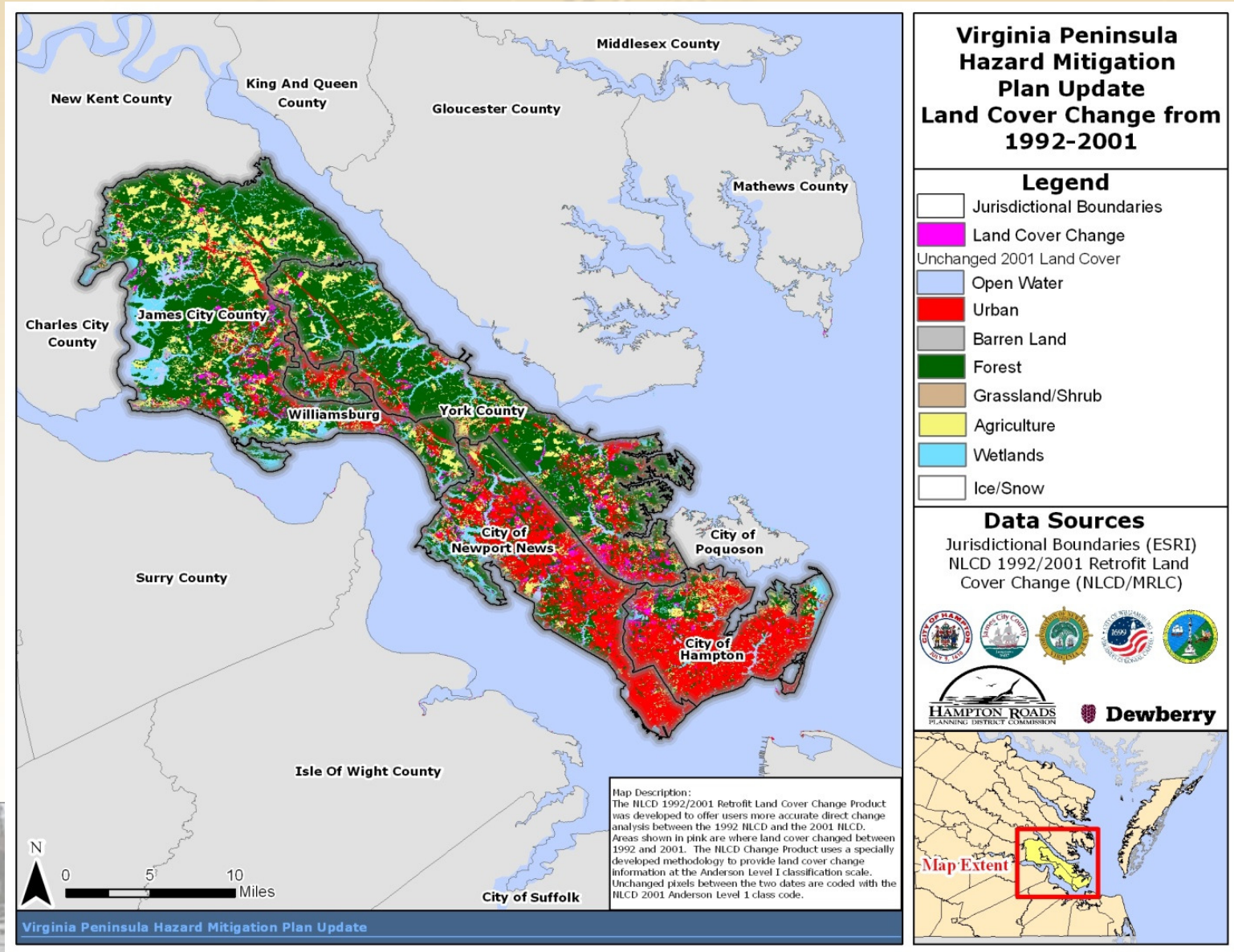
Climate Change

- Considered as a potential *amplifier* of existing natural hazards (i.e. flooding, heat, drought, etc.)
- Discussion of projections as related to specific hazards
  - Potential future impact on hazard:
    - Frequency
    - Intensity
    - Distribution

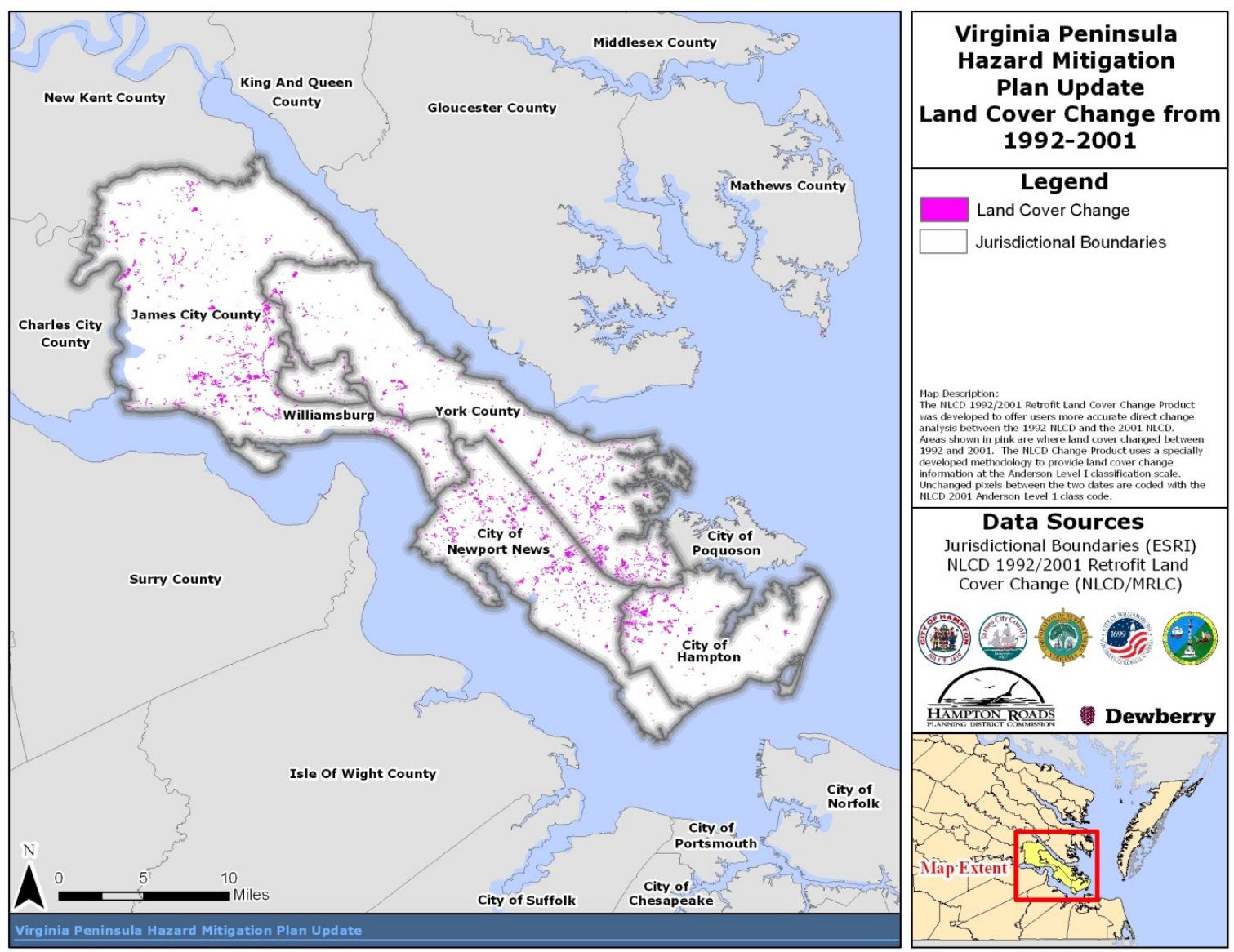
Land Use and Development

- Jurisdiction Provided Zoning Data and/or Maps discussed in report
- National Land Cover Dataset (NLCD)
  - 1992 & 2001 datasets
  - Land Use types defined by the NLCD Land Use Change Project
    - Percent Change for:
      - Urban Land Cover
      - Forest Cover
      - Wetland Cover
      - Agricultural Land Cover

Land Cover Change



Land Cover Change



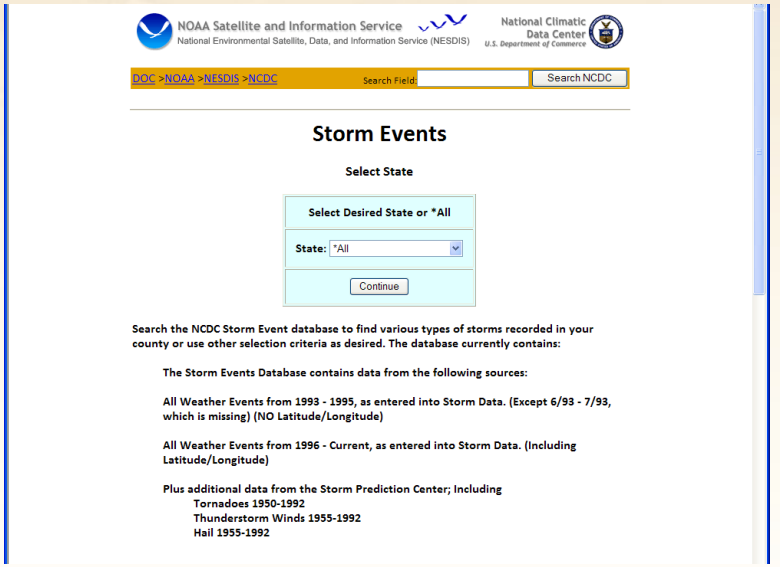
Critical Facilities

Critical Facilities for the Peninsula							
Jurisdiction	***Law Enforcement (Including Police)***	***Fire/EMS***	***Hospital / Medical***	***Schools/ Education***	***Emergency Management***	***Other***	***Total***
James City County	3	6	1	9	1	11	**31**
York County	2	7	1	17	2	153	**182**
City of Hampton	2	11	1	11	1	42	**68**
City of Newport News	13	13	4	38	1	112	**181**
City of Williamsburg	1	1	1	3	1	21	**28**
Totals	**21**	**38**	**8**	**78**	**6**	339	**490**

Source: Jurisdiction-provided, HRPDC, VEDP

Hazard Data Availability

- **Federally Declared Disasters**
  - Jurisdictions declared
  - Nature of disaster
  - Type(s) of assistance provided
- **National Climatic Data Center (NCDC) Storm Events Database**
  - Reports From Local NWS Offices
  - Includes location and time of event, property and crop damages, injuries and deaths
  - Data may be biased by population
  - Need to process data to assign all events/damages to specific jurisdictions



Hazard Data Availability

- **National Weather Service**
  - Warning data
    - Tornado
    - Severe thunderstorm
    - Flash flood

Federally Declared Disasters

- 10 of the 53 Virginia disasters (since 1957) have included at least one community in the Peninsula planning area
- Disaster Types:
  - 5 Hurricanes (flooding, winds)
  - 2 Winter Storm/Blizzard
  - 3 Severe Storms/Flooding

National Climatic Data Center (NCDC) Storm Events Database

- Events records from February 1, 1951 – July 31, 2010
- Data from VDEM for ranking parameters
- Data Processing to be able to compare & complete loss estimates
  - Zonal Events
  - Normalizing by Number of Counties
  - Damage Inflation
- *Ranking Methodology Discussed Later in Presentation*

NCDC Data

Total NCDC Storm Events Data and Annualized Loss Estimates.						
Jurisdiction	**Total Events**	**Total Crop Damage**	**Total Property Damage**	**Annualized Crop Damage**	**Annualized Property Damage**	**Total Annualized Loss**
James City County	149	$8,719,507	$49,844,849	$532,938	$2,674,518	$3,207,456
York County	178	$4,215,962	$73,740,286	$281,006	$3,865,764	$4,146,770
City of Hampton	153	$4,215,962	$61,581,421	$281,006	$3,455,238	$3,736,244
City of Newport News	160	$4,215,962	$59,995,109	$281,006	$3,408,608	$3,689,614
City of Williamsburg	104	$4,215,962	$53,153,170	$281,006	$3,481,535	$3,762,540
Total	**744**	**$25,583,356**	**$298,314,835**	**$1,656,960**	**$16,885,663**	**$18,542,623**

Hazard Ranking

- The purpose of the hazard identification and risk assessment is to provide a factual basis for developing mitigation strategies; to ***prioritize*** those jurisdictions which most threatened and vulnerable to natural hazards.

- FEMA guidance indicates that the jurisdictions at ***greatest risk*** to specific hazards should be identified, considering both the characteristics of the hazard and the jurisdictions' degree of vulnerability.

  A variety of analysis methods may be sufficient to meet these goals; FEMA does not mandate a specific analysis method.

2011 Hazard Ranking

- **"Semi-Quantitative" Scoring System**
  - Actual Data Values grouped in categories based on statistics
- **NCDC Data with normalization (inflation …)**
  - Limitations with probability & impact data
  - Zonal events (events impacting several jurisdictions simultaneously)
- **Parameters Used:**
  - Population Vulnerability (weight 0.5)
  - Population Density (weight 0.5)
  - Geographic Extent (weight 1.5)
  - Annualized Deaths & Injuries (weight 1)
  - Annualized Crop & Property Damage (weight 1)
  - Annualized Events (weight 1)

Jurisdictional Risk (RS):

RS = (0.5*(PV + PN)) + ID + EV + PD + CD + (1.5*GE)

NCDC Ranking Spreadsheet

A1 fx Ranking Worksheet

Ranking Worksheet

LEGEND	WEIGHTING
PV - Population Vulnerability (percent of total in the region)	0.5
PN - Pop Density (pop per sq mi)	0.5
EV- Annualized Events	1
PD - Annualized Property Damage	1
CD - Annualized Crop Damage	1
I/D - Injuries and Deaths	1
GE - Geographic Extent	1.5
RS - Risk	

				Flood							High Wind							Thunderstorm							Tornado			
FIPS	County	PV	PN	EV	PD	CD	ID	GE	RS	Rank	EV	PD	CD	ID	GE	RS	Rank	EV	PD	CD	ID	GE*	RS	Rank	EV	PD	CD	I
51095	James City County	2	1	2	1	3	1	4	14.5	Med-High	2	1	1	1	0	6.5	Low	3	1	2	4	3	16	Med-High	2	2	1	
51199	York County	2	2	3	4	1	1	4	17	Med-High	2	1	1	4	0	10	Med-Low	3	3	1	4	4	19	High	2	2	1	
51650	City of Hampton	3	4	3	3	1	1	4	17.5	Med-High	2	1	1	4	0	12	Med	3	1	1	4	3	17	Med-High	2	2	1	
51700	City of Newport News	4	4	3	3	1	1	4	18	Med-High	2	1	1	4	0	12	Med	3	1	1	4	2	16	Med-High	2	2	1	
51830	City of Williamsburg	1	3	3	3	1	1	2	13	Med	2	1	1	4	0	10	Med-Low	2	1	1	1	2	10	Med-Low	1	1	1	
											Not included in plan update																	
									16							10		**based on GE for tst					15.6				

HAZARDS:	years of record in the hampton region
Flooding	16
High Wind	16
Thunderstorm	53
Tornado	59
Tropical Storm/Hurricane	15
Winter Weather	17
Drought	17
Wildfire	3

Population Vulnerability (PV)

Rank	Description	
1	<= 0.12 %	of region's population
2	0.13% - 0.22%	of region's population
3	0.23% - 0.30%	of region's population
4	> = 0.31%	of region's population

Population Density (PN)

Rank	Description	
1	<= 603.2	people/sq mi
2	603.3 – 920.6	people/sq mi
3	920.7 - 1,534.5	people/sq mi
4	>= 1,534.6	people/sq mi

Annualized Events (EV)

Rank	Definition	
1	<= 0.10	events per year
2	0.11 – 1.0	events per year
3	1.01 – 2.5	events per year
4	>= 2.51	events per year

Total Deaths & Injuries (ID)

Rank	Definition	
1	None	deaths/injuries
2		
3		
4	>= 1	deaths/injuries

Geographic Extent : Percentage of a jurisdiction impacted by the hazard (GE)

Hazard	Description	Category Breaks			
		Rank	Description		
Flood	Percent of a jurisdiction that falls within FEMA Special Flood Hazard Area (SFHA). *Data: FEMA Floodplains (DFIRMs)*	1	<=1.99%		
		2	2.00-4.99%		
		3	5.00 -6.99%		
		4	>=7.00%		
Tropical Storm/Hurricane	Average maximum wind speed throughout the entire jurisdiction. *Data: HAZUS 3-second Peak Gust Wind Speeds*	1	<= 59.9		
		2	60.0 - 73.9		
		3	74.0 - 94.9		
		4	>= 95.0		
Thunderstorm	Events where hail >= 3/4 " diameter; and/or wind gusts to 58 mph; and/or lightning caused damage, deaths or injuries. *Data: NCDC storm events database*	1	Hail	Lightning	Tstorm wind
			<=10	<=2	<=10
		2	10.1 - 15	2.1 - 3	10.1 - 20
		3	15.1 - 20	3.1 - 4	20.1 - 30
		4	>20.1	>=4.1	>=30.1
Winter Storm	Average annual number of days receiving at least 3 inches of snow, calculated as an area-weighted average for each jurisdiction. *Data: NWS snowfall statistics*	1	<= 1.49		
		2	1.50 - 1.99		
		3	2.00 - 2.99		
		4	>= 3.0		
Tornado	Annual tornado hazard frequency (times one million), calculated as an area-weighted average for each jurisdiction. *Data: NCDC tornado frequency statistics*	1	<= 1.24		
		2	1.25 - 9.99		
		3	10.00 - 99.9		
		4	>= 100.00		
Drought	Extent assumed to be uniform throughout the planning region *Data: NCDC storm events database*	1	Entire planning region		
		2			
		3			
		4			

Annualized Crop and Property Damage (CD, PD)

Rank	Definition: Crop Damage	Definition: Property Damage
1	<= $4,956.39 per year	<= $ 65,485.39 per year
2	$4,956.40 – 27,017.39 per year	$65,485.40 - $315,695.39 per year
3	$27,017.40 - $255,038.09 per year	$315,695.40 - $800,407.49 per year
4	>= $255,038.10 per year	>= $800,407 per year

Jurisdictional Risk (RS) Formula:

RS = (0.5*(PV + PN)) + ID + EV + PD + CD + (1.5*GE)

Potential Losses (annualized)

Requirement § 201.6(c)(2)(ii)(B): *[The plan* ***should*** *describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate … .*

2011 Update Loss Estimates for:

Hurricane Wind (HAZUS-MH Annualized Loss)
Flooding (HAZUS-MH Annualized Loss and 100-yr)
Drought (NCDC)
Tornado Wind (NCDC)
Significant Thunderstorms (NCDC)
Earthquake (HAZUS-MH Annualized Loss)
Winter Storm (NCDC)
Wildfire (VDOF)

HAZUS-MH Scenarios

- Level I Analysis
  - Nationally-developed data for building square footage, building value, population characteristics, costs of building repair and economic data (broken down by census division units)
    - Flood
    - Hurricane Winds
    - Earthquake (via Commonwealth of Virginia hazard mitigation plan)
- HAZUS is not required in Local Mitigation Plans, communities are encouraged to use HAZUS to form a scientific basis from which the mitigation strategy is developed.

Hazard Specific Analysis

Primary Data Sources

- **Hazard Data**
  - Flood: FEMA FIRMs, FEMA Rep Loss, VDEM, DCR, NCDC & HAZUS-MH
  - Tornado: NCDC & SVRGIS
  - Hurricane: HAZUS-MH, NCDC, National Hurricane Center
  - Severe Thunderstorms: NCDC & SVRGIS
  - Winter Storm: NCDC, NWS
  - Earthquake: HAZUS-MH (via Commonwealth of Virginia hazard mitigation plan), USGS
  - Wildfire: VDOF
  - Drought: NCDC, U.S. Drought Monitor

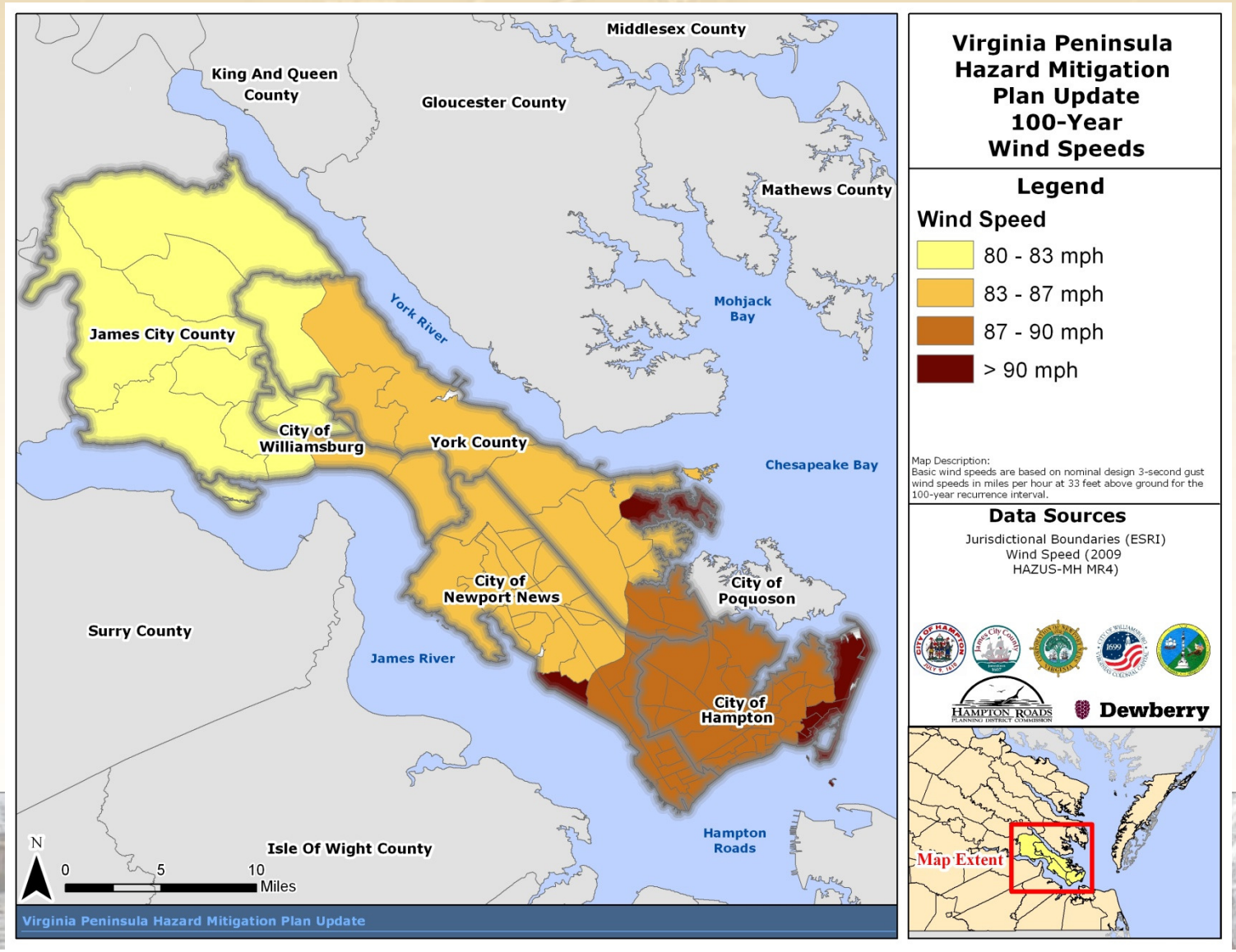
Hurricanes and Tropical Storms

Data Source: NCDC & HAZUS

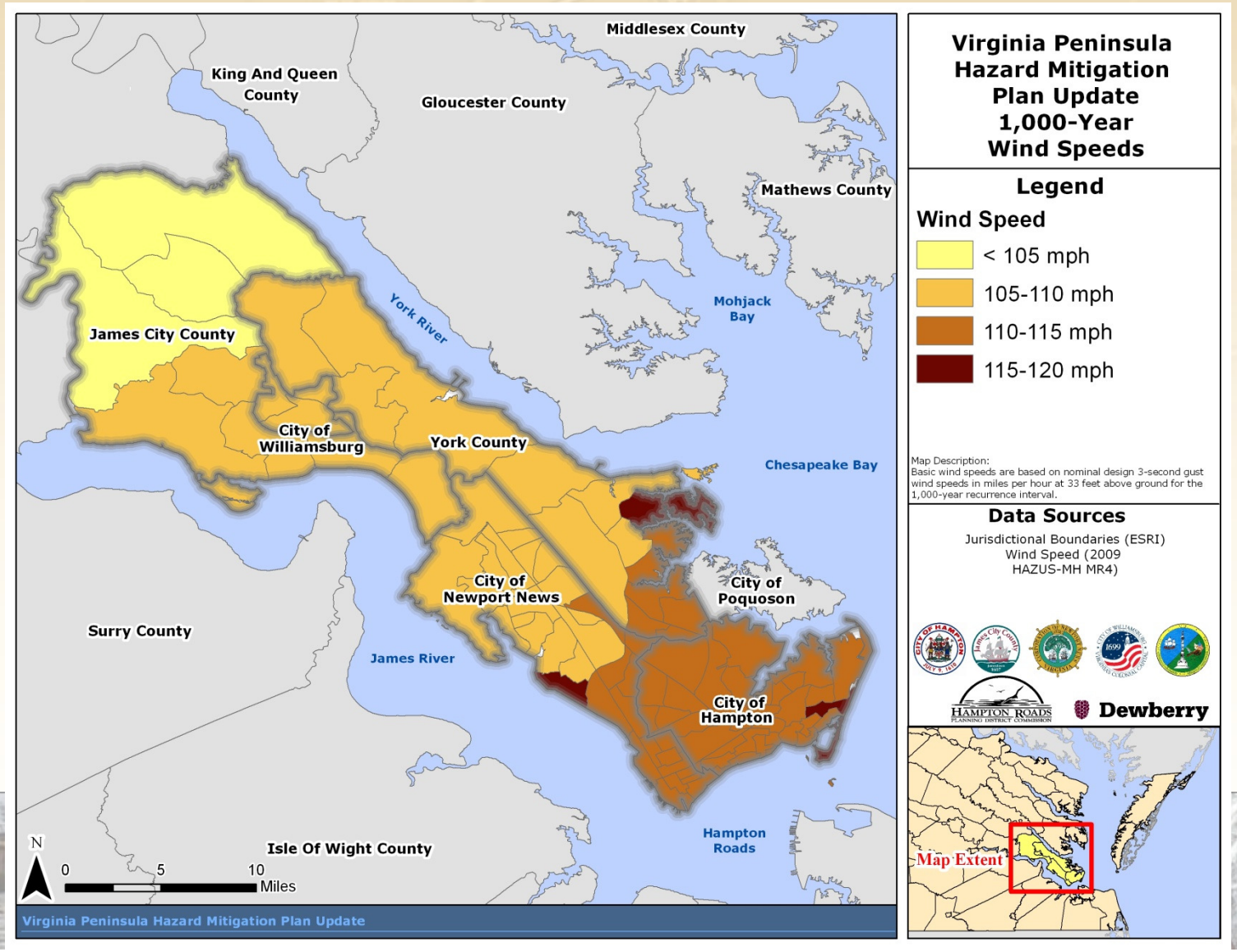
- NCDC Annualized Loss **$14,337,167**
- HAZUS Annualized Loss **$9,666,524**

Hurricane Category	Wind Speed	Barometric Pressure	Damage Potential
1	75-95 mph	>980 Mb	Minimal
2	96-110 mph	965-979 Mb	Moderate
3	111-130 mph	945-964 Mb	Extensive
4	131-155 mph	920-944 Mb	Extreme
5	>155 mph	<920 Mb	Catastrophic

100-Year Hurricane Wind Speed

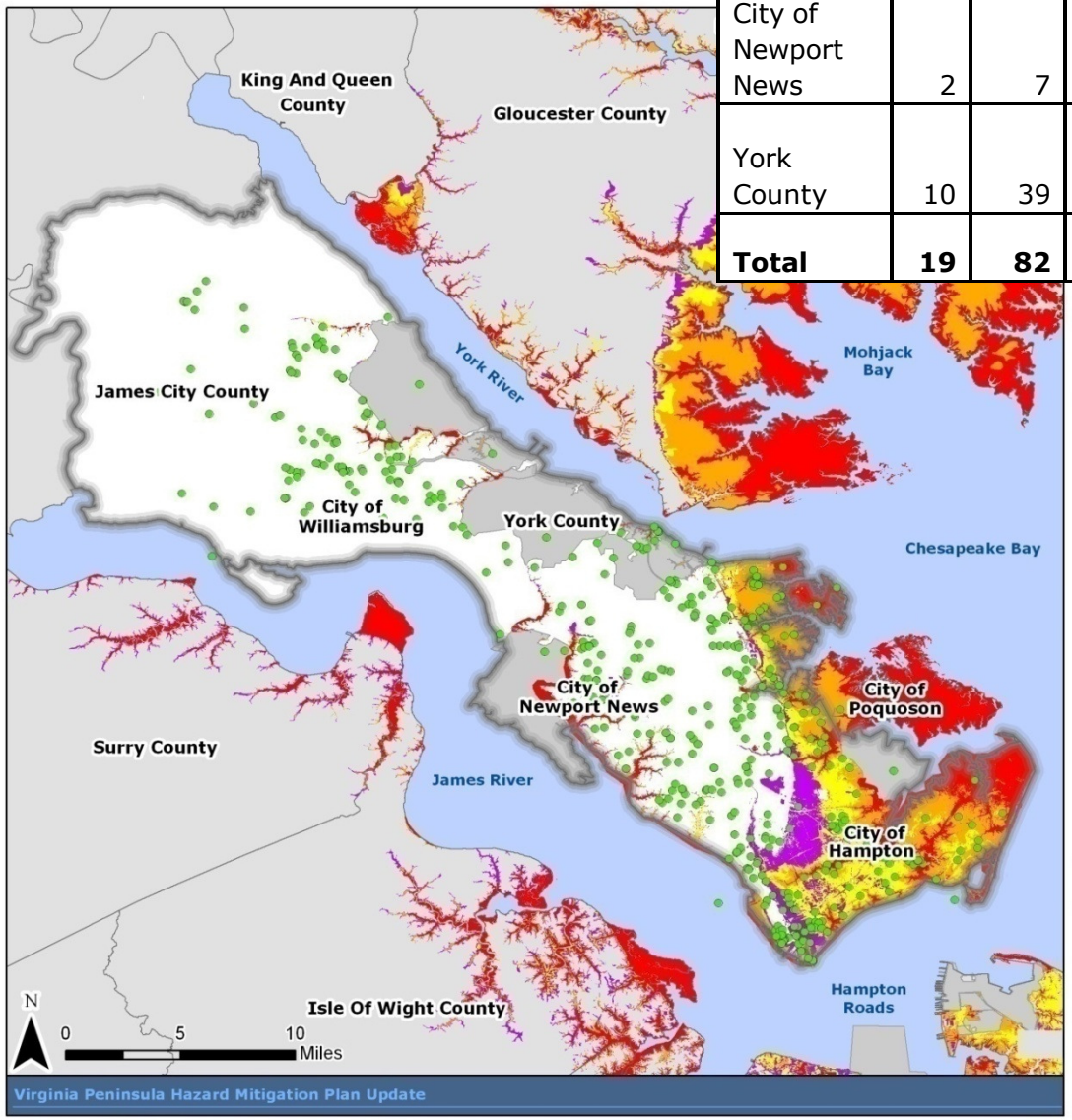


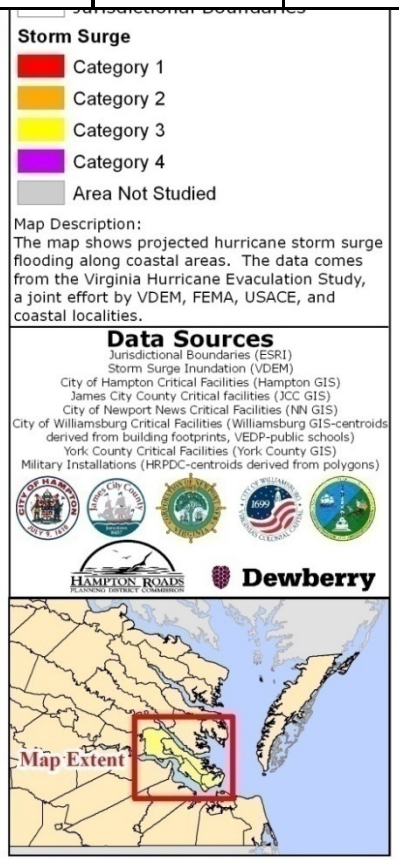
1000-Year Hurricane Wind Speed



Cumulative Number of Critical Facilities in Mapped Storm Surge Zones

Jurisdiction	Hurricane Storm Surge Category				
	1	2	3	4	Facilities Not Studied
City of Hampton	7	36	54	57	1 (Langley Air Force Base)
City of Newport News	2	7	24	41	2 (Fort Eustis & Gen Stanford Ele)
York County	10	39	45	48	5 (Camp Peary, Naval Supply, Coast Guard Training, Naval Weapons, Coast Guard)
Total	**19**	**82**	**123**	**146**	**8**

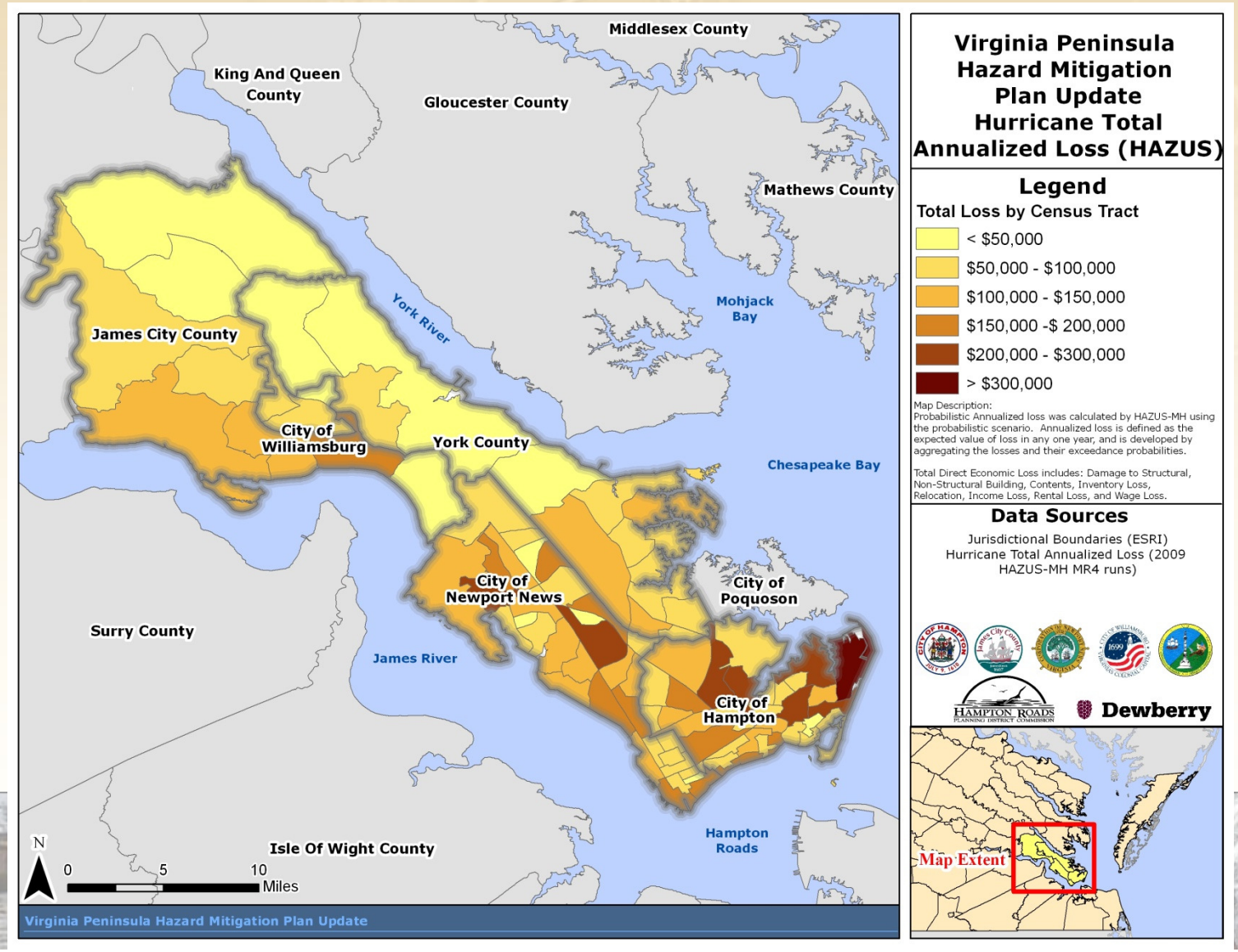




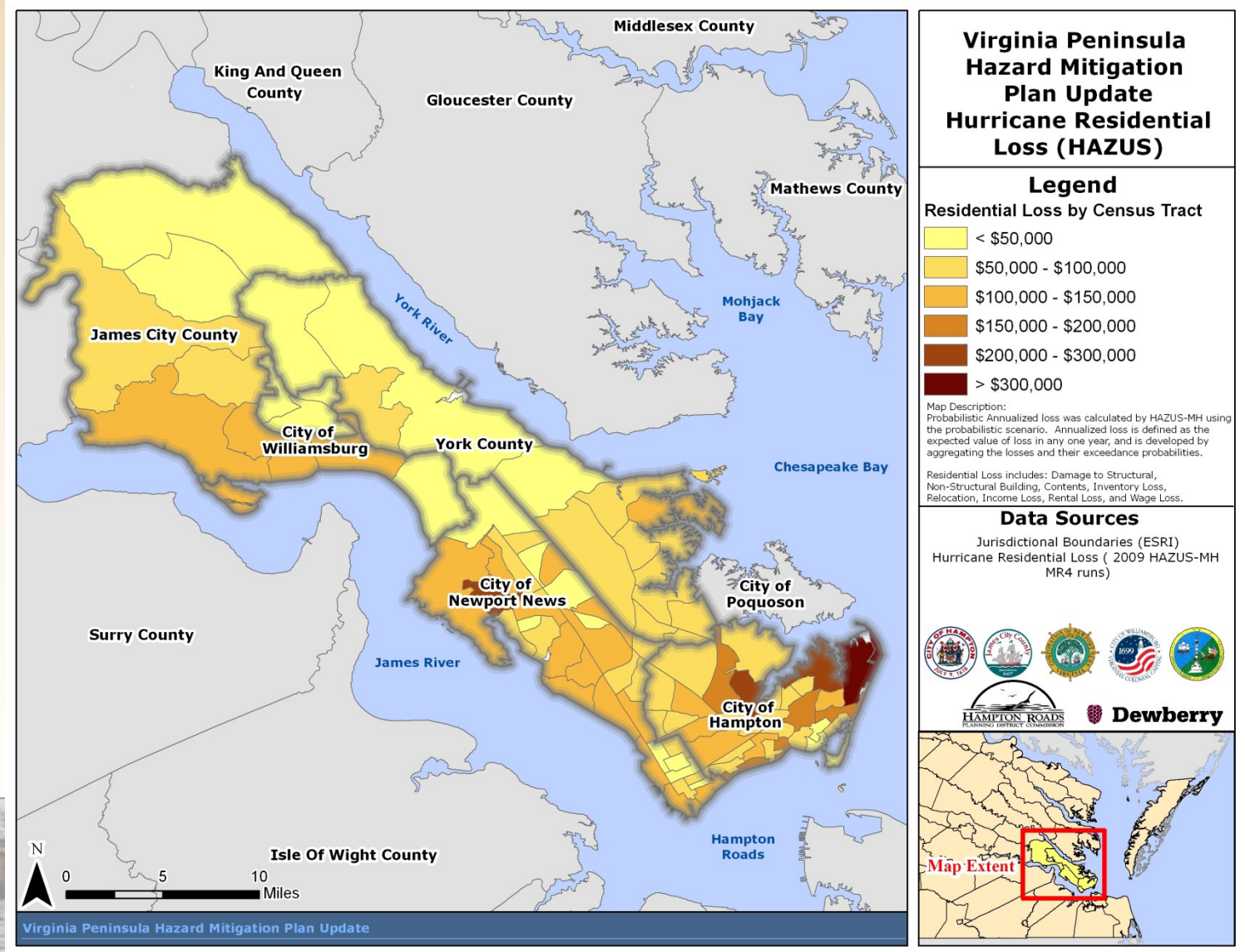
Annualized Hurricane Loss

NCDC Versus HAZUS Hurricane Wind Annualized Loss						
Jurisdiction	**NCDC Total Annualized Losses**	**NCDC Annualized Property Losses**	**NCDC Annualized Crop Losses**	**HAZUS Total Annualized Losses**	**HAZUS Annualized Building Losses (Building and Contents)**	**HAZUS Annualized Agricultural Losses**
James City County	$2,629,539	2,383,613	$245,926	$697,883	$613,451	$1,258
York County	$2,926,931	2,646,364	$280,567	$990,194	$873,293	$2,270
City of Hampton	$2,926,883	2,646,316	$280,567	$4,045,195	$3,473,122	$4,499
City of Newport News	$2,926,883	2,646,316	$280,567	$3,792,523	$3,237,066	$4,929
City of Williamsburg	$2,926,931	2,646,364	$280,567	$128,667	$108,704	$85
TOTALS	**$14,337,167**	**12,968,975**	**$1,368,192**	**$9,654,461**	**$8,305,636**	**$13,041**

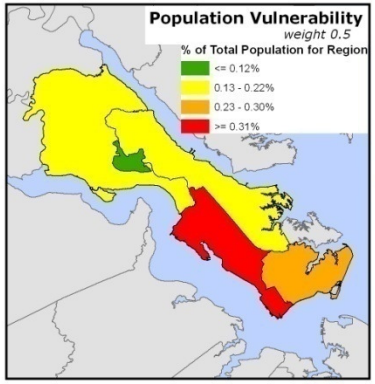
Annualized Hurricane Loss

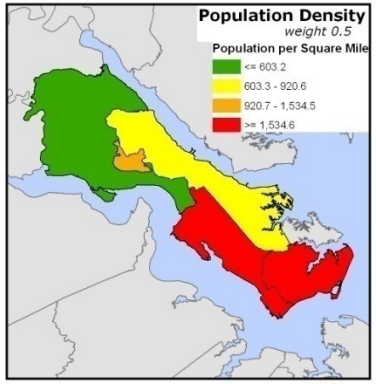


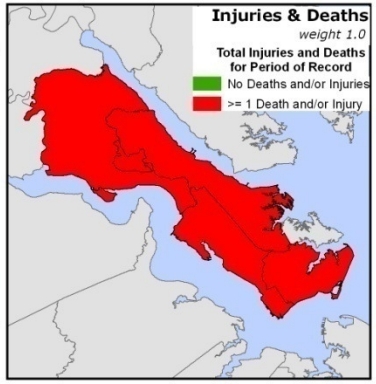
Annualized Hurricane Residential Loss

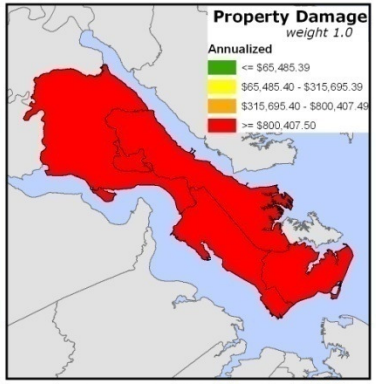


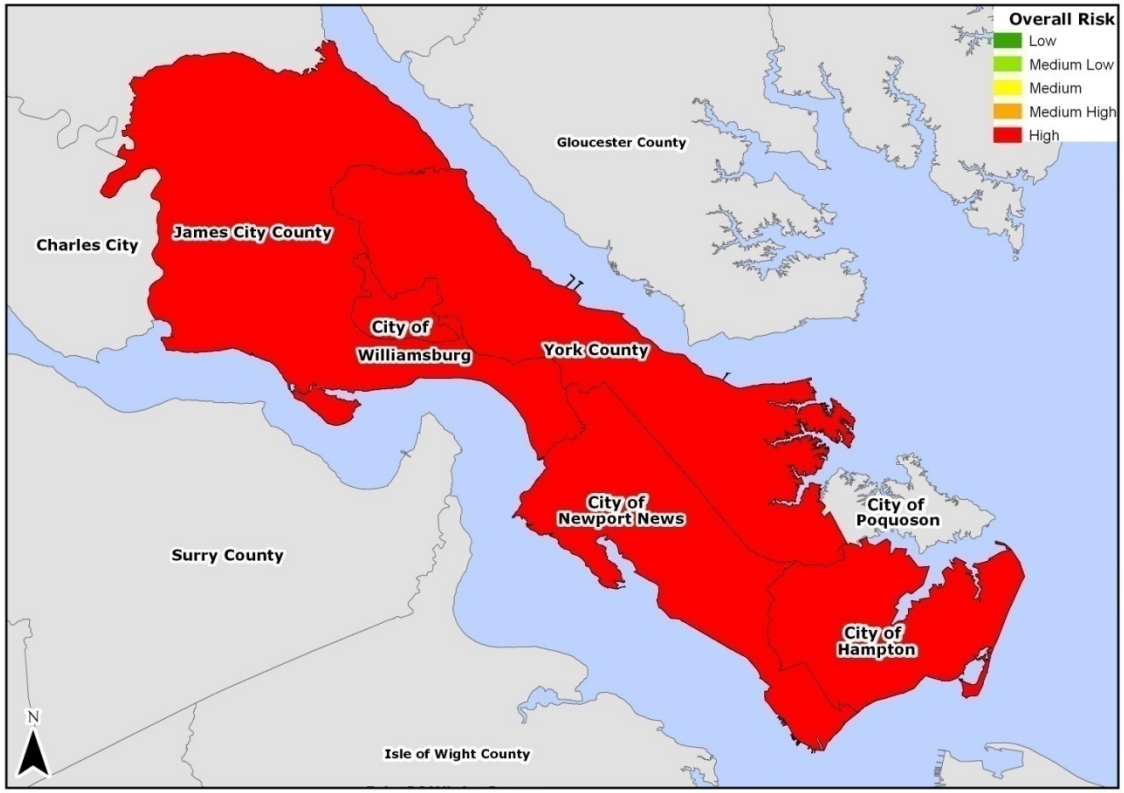
Hurricane Hazard Ranking

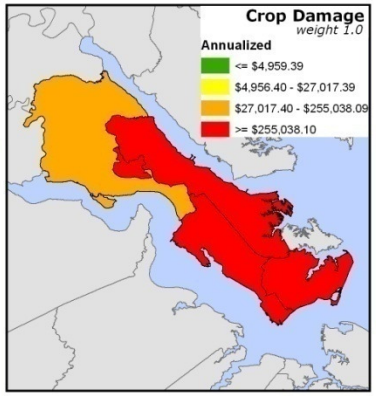


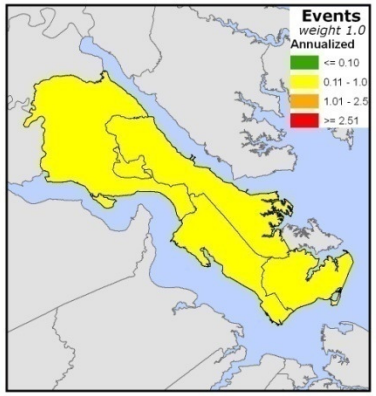


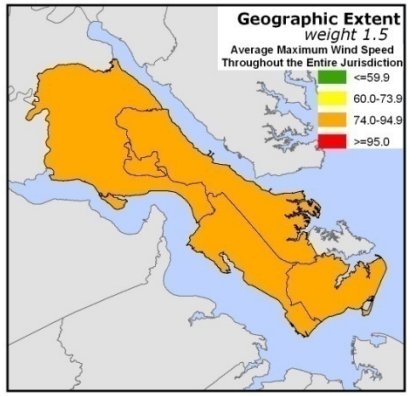












Virginia Peninsula Hazard Mitigation Plan Update
Tropical Storm/Hurricane Hazard Ranking Parameters and Risk Map

Hazard Ranking:

A number of factors have been considered in this risk assessment to be able to compare between jurisdictions and hazards. The factors have been added together to come up with the overall total ranking for each hazard.

Factors and Weighting Include:

-Population Vulnerability (PV) 0.5 weighting
-Population Density (PN) 0.5 weighting
-Injuries & Deaths (ID) 1.0 weighting
-Property Damage (PD) 1.0 weighting
-Crop Damage (CD) 1.0 weighting
-Annualized Events (EV) 1.0 weighting
-Geographic Extent (GE) 1.5 weighting

Risk = PV*0.5+PN*0.5+ID*1.0+PD*1.0+ CD*1.0+EV*1.0+GE*1.5

Data Sources:

Jurisdictional Boundaries (ESRI)
Hazard Data (NOAA NCDC [6/27/1951 - 7/29/2010])
Methodology (Adapted from Commonwealth of Virginia EOP 2010)

HAMPTON ROADS PLANNING DISTRICT COMMISSION

Dewberry

Flood

- **Section examines flooding/inundation due to:**
  - Coastal/urban/riverine/flash flooding
  - Sea Level Rise
  - Tsunami
  - Dam Failure

Source: FEMA

Flood

- Risk Assessment
  - Probability (100-yr and Annualized)
    - HAZUS-MH
  - Impact & Vulnerability
    - HAZUS-MH
  - Risk
    - Critical Facility Risk
      - 2006 Analysis Results
      - HAZUS-MH
    - Jurisdictional Risk
      - 2006 Analysis Results
      - HAZUS-MH

Source: FEMA

National Flood Insurance Program (NFIP)

Peninsula planning region has more than **18,584** National Flood Insurance policies in-force

- Insurance in-force: approx. **$4.3 billion**
- Claims (1/1/1978 – 9/30/2010)**:**
  - **7,104**
  - **$110 million**

NFIP

County	Policy Statistics (as of 9/30/2010)		Claim Statistics (1/1/1978 - 9/30/2010)	
	Policies In-Force	Insurance In-Force	Total Claims/Losses	Total Payment
City of Hampton	11,424	$2,504,618,500	4,718	$61,879,725
City of Newport News	2,662	$602,321,300	582	$8,825,081
York County	3,508	$974,515,100	1,467	$33,311,277
James City County	942	$253,345,500	318	$5,994,028
City of Williamsburg	48	$12,789,700	19	$147,414
Region TOTAL	**18,584**	**$4,347,590,100**	**7,104**	**$110,157,524**
VIRGINIA TOTAL	110,673	$26,108,197,900	38,209	$553,481,940

Source: http://bsa.nfipstat.com from 12/15/2010

NFIP Mapping

Community Name	Init FHBM Identified	Init FIRM Identified	Curr Eff Map Date	Reg-Emer Date	DFIRM Effective Date
City of Hampton	3/24/1970	5/28/1971	7/3/1995	1/15/1971	**11/9/2010***
City of Newport News	8/16/1974	5/2/1977	1/17/1986	5/2/1977	**9/17/2010***
York County	11/29/1974	12/16/1988	6/16/2009	12/16/1988	**6/16/2009**
James City County	7/18/1975	2/6/1991	9/28/2007	2/6/1991	**9/28/2007**
City of Williamsburg	3/28/1975	11/20/1981	9/28/2007	11/20/1981	**9/28/2007**

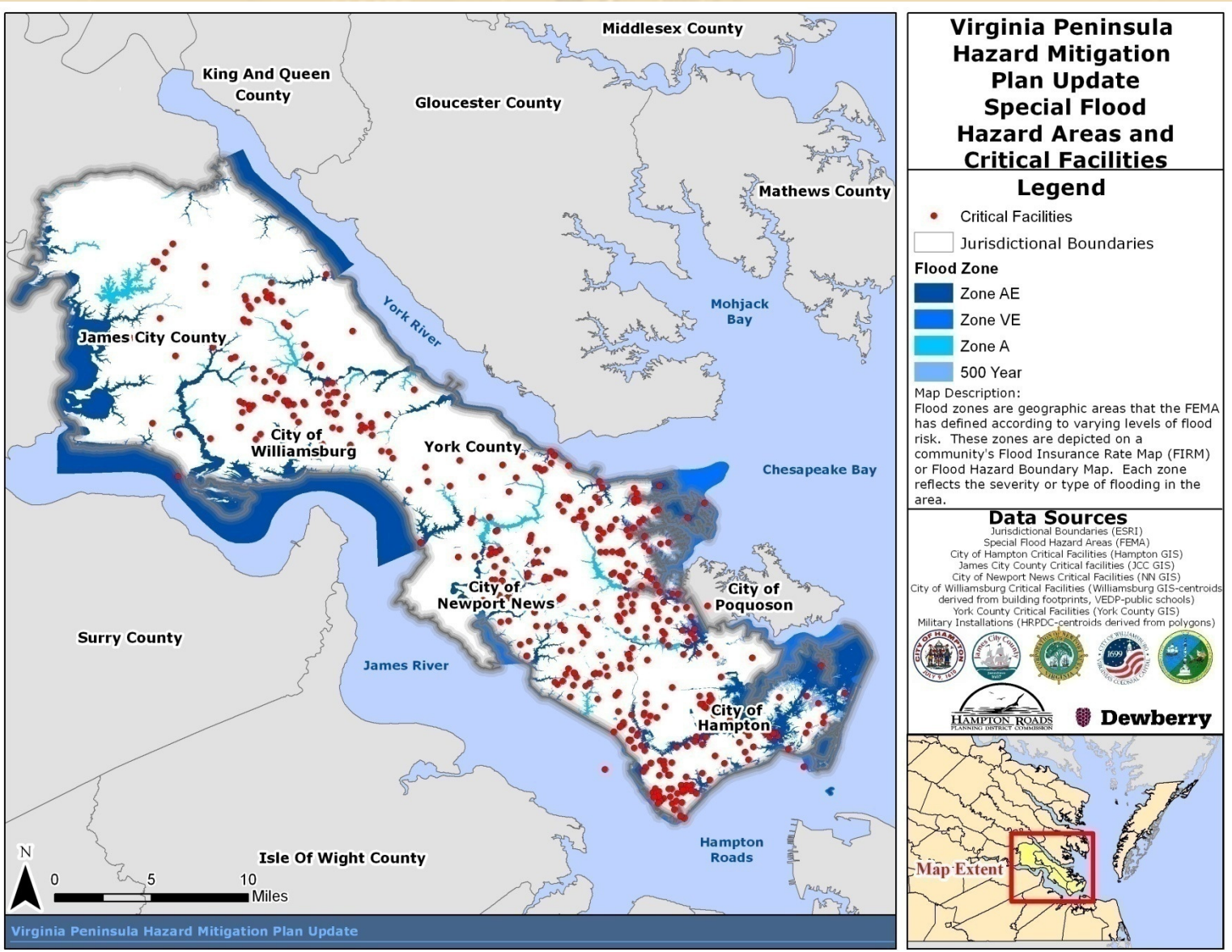
as of 10/5/2010 ***http://www.fema.gov/cis/VA.html***

preliminary DFIRM data provided by FEMA

Repetitive Loss / Severe Repetitive Loss

Community Name	Total Building Value	# of RL Properties	# of SRL Properties	Number of Claims	Total Losses	Total Building Losses	Total Contents Losses	Average Claim
City of Hampton	$155,471,157	824	27	1,919	$36,692,712	$32,482,114	$4,210,598	$19,121
City of Newport News	$17,815,208	60	1	137	$4,575,167	$4,242,038	$333,129	$33,395
York County	$44,636,637	213	2	470	$13,240,242	$11,410,903	$1,829,338	$28,171
James City County	$7,485,232	27	2	71	$1,739,316	$1,538,677	$200,638	$24,497
City of Williamsburg	$3,748,646	4	0	9	$104,271	$95,389	$7,882	$11,586
Total	**$229,156,880**	**1,128**	**32**	**2,606**	**$56,351,708**	**$49,769,122**	**$6,581,585**	**$23,354**

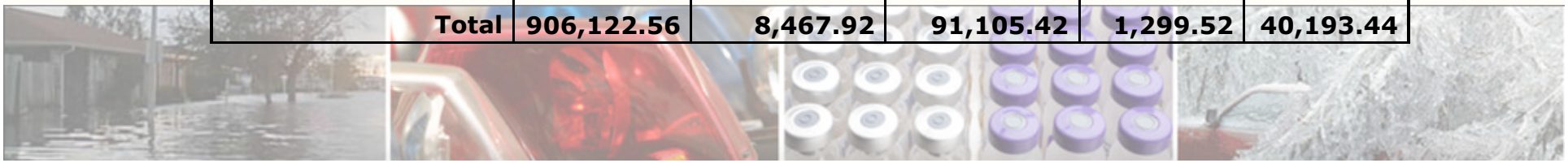
DFIRM / Critical Facilities



Hampton Roads Sanitation District Infrastructure / SFHAs

Hampton Roads Sanitation District pump and treatment plant locations within SFHAs						
Jurisdiction	**Total Pump Stations**	**Total Treatment Plants**	**Pump Stations within zone AE**	**Pump Stations within zone AE with FW**	**Pump Stations within 500-year**	**Treatment Plants within zone AE**
City of Hampton	10	0	5		1	
James City County	3	1	1			
City of Newport News	13	2	2	1	1	1
City of Williamsburg	1	0				
York County	3	1				
Total	**30**	**4**	**8**	**1**	**2**	**1**

Hampton Roads Sanitation District interceptor length within SFHAs (Linear Feet)					
	Interceptor Length				
Jurisdiction	**Total Length**	**Zone A**	**Zone AE**	**Zone VE**	**500-year**
City of Hampton	250,090.58	-	62,947.18	715.64	31,672.43
James City County	157,800.48	-	8,587.52	-	314.79
City of Newport News	329,045.82	7,345.45	14,745.84	3.15	4,825.90
City of Williamsburg	45,958.21	-	210.56	-	4.05
York County	123,227.46	1,122.47	4,614.32	580.73	3,376.27
Total	**906,122.56**	**8,467.92**	**91,105.42**	**1,299.52**	**40,193.44**



HAZUS-MH MR4 Analysis

Flood Runs completed for the 100-yr, 500-yr, and Probabilistic Scenarios

- $2.8 billion in losses could be expected from a 100-year event and

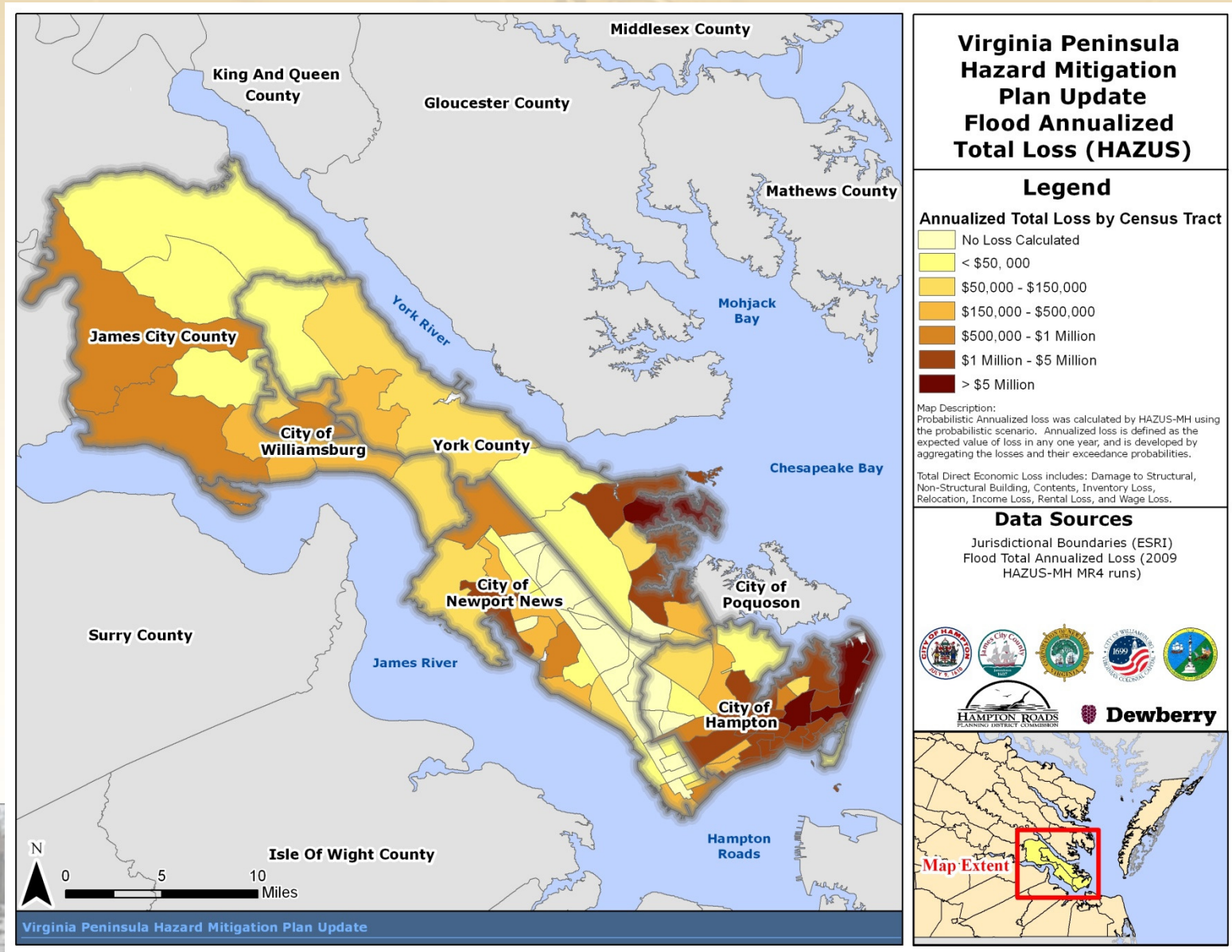
$3.9 billion from a 500-year event in the Peninsula planning region

- $94.5 million annually in damages due to flood events
  - Property or "capital stock" losses make up about $94,389,000 (building, content, and inventory) or about 99.8% of the annualized loss
  - Business interruption accounts for 0.12% of the annualized losses and includes income, rental, wage, and relocation costs.
  - Residential losses account for the majority of the estimated losses

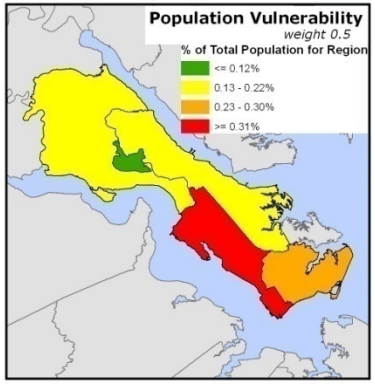
HAZUS-MH MR4 Analysis

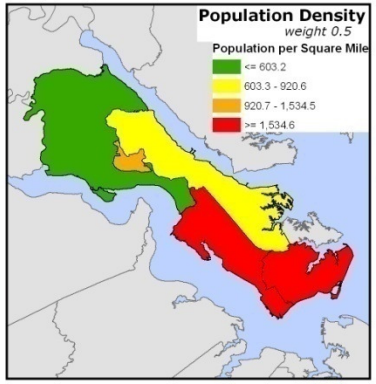
HAZUS-MH MR4 Flood Module Annualized Building Loss [in thousands of $]								
Jurisdiction	**Building Loss**	**Content Loss**	**Inventory Loss**	**Relocation Loss**	**Income Loss**	**Rental Loss**	**Wage Loss**	**Total Loss**
City of Hampton	$38,355	$33,163	$365	$14	$0	$4	$77	$71,978
James City County	$1,177	$887	$9	$0	$0	$0	$1	$2,074
City of Newport News	$4,333	$3,631	$80	$4	$0	$0	$4	$8,052
City of Williamsburg	$454	$490	$0	$0	$0	$0	$2	$946
York County	$6,387	$4,992	$66	$3	$0	$0	$9	$11,457
Total	**$50,706**	**$43,163**	**$520**	**$21**	**$0**	**$4**	**$93**	**$94,507**

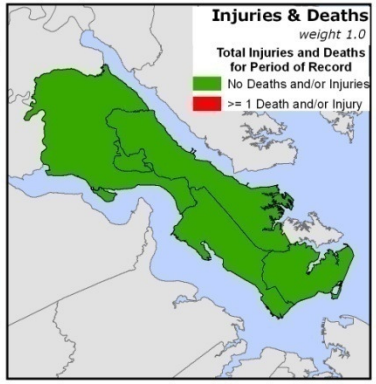
Estimated Annualized Flood Loss

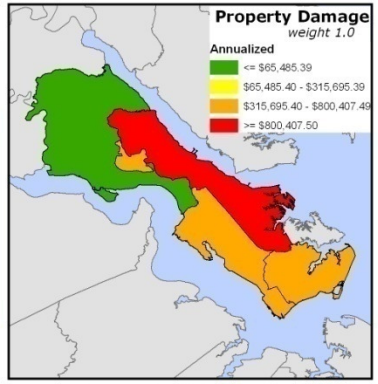


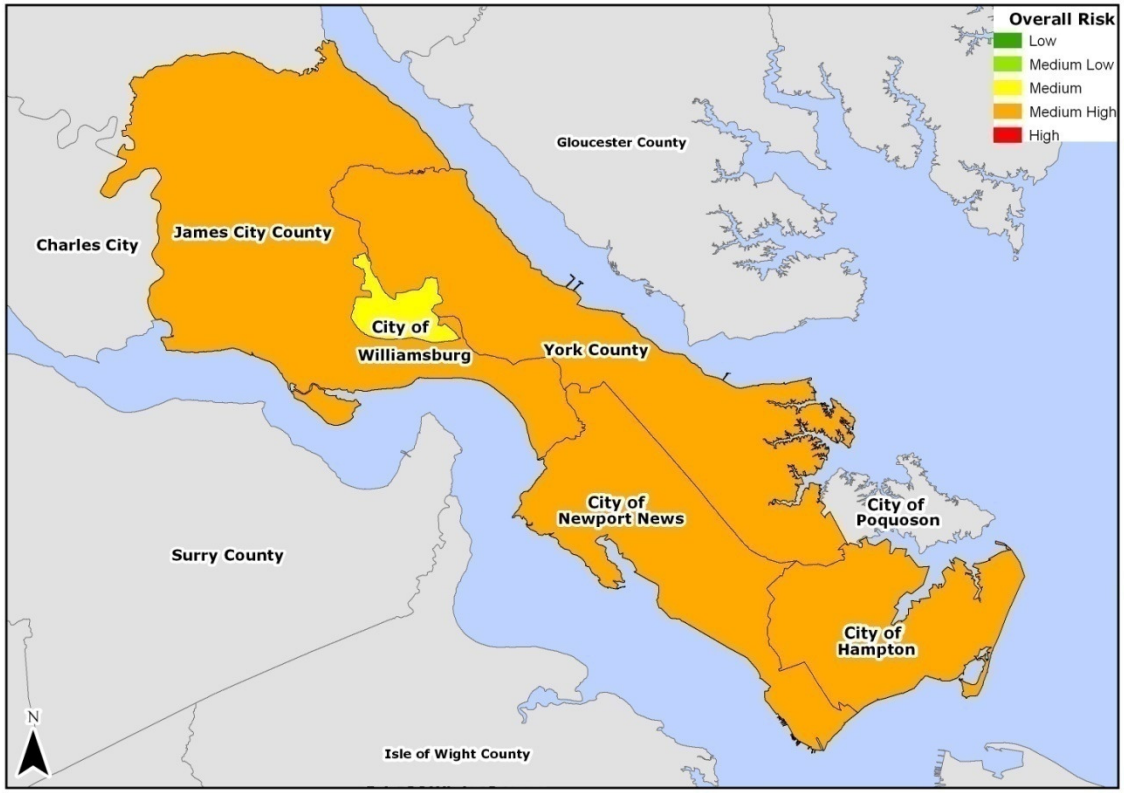
Flood Hazard Ranking

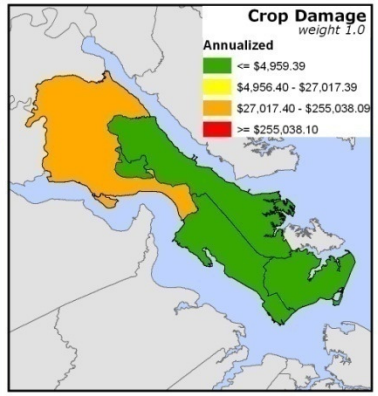


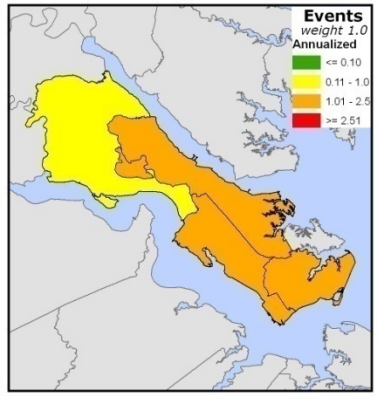


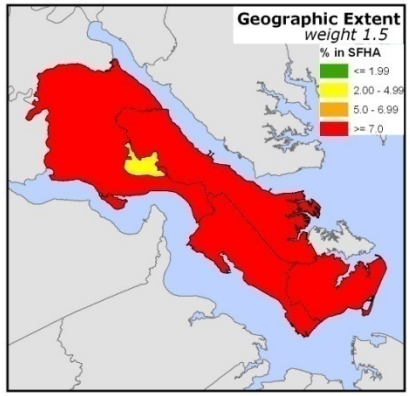












Virginia Peninsula Hazard Mitigation Plan Update Flood Hazard Ranking Parameters and Risk Map

Hazard Ranking:

A number of factors have been considered in this risk assessment to be able to compare between jurisdictions and hazards. The factors have been added together to come up with the overall total ranking for each hazard.

Factors and Weighting Include:

-Population Vulnerability (PV) 0.5 weighting
-Population Density (PN) 0.5 weighting
-Injuries & Deaths (ID) 1.0 weighting
-Property Damage (PD) 1.0 weighting
-Crop Damage (CD) 1.0 weighting
-Annualized Events (EV) 1.0 weighting
-Geographic Extent (GE) 1.5 weighting

Risk = PV*0.5+PN*0.5+ID*1.0+PD*1.0+ CD*1.0+EV*1.0+GE*1.5

Data Sources:

Jurisdictional Boundaries (ESRI)
Hazard Data (NOAA NCDC [6/27/1951 - 7/29/2010])
Methodology (Adapted from Commonwealth of Virginia EOP 2010)

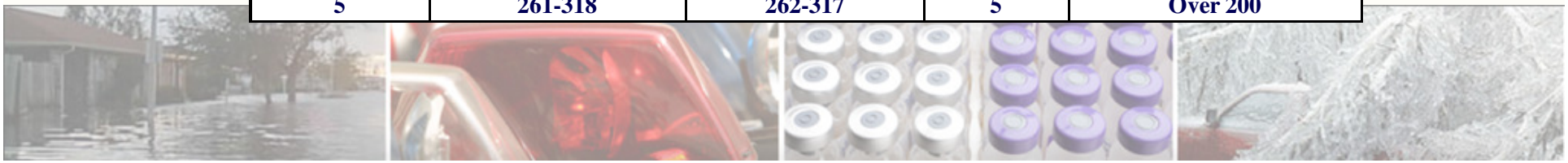
HAMPTON ROADS PLANNING DISTRICT COMMISSION

Dewberry

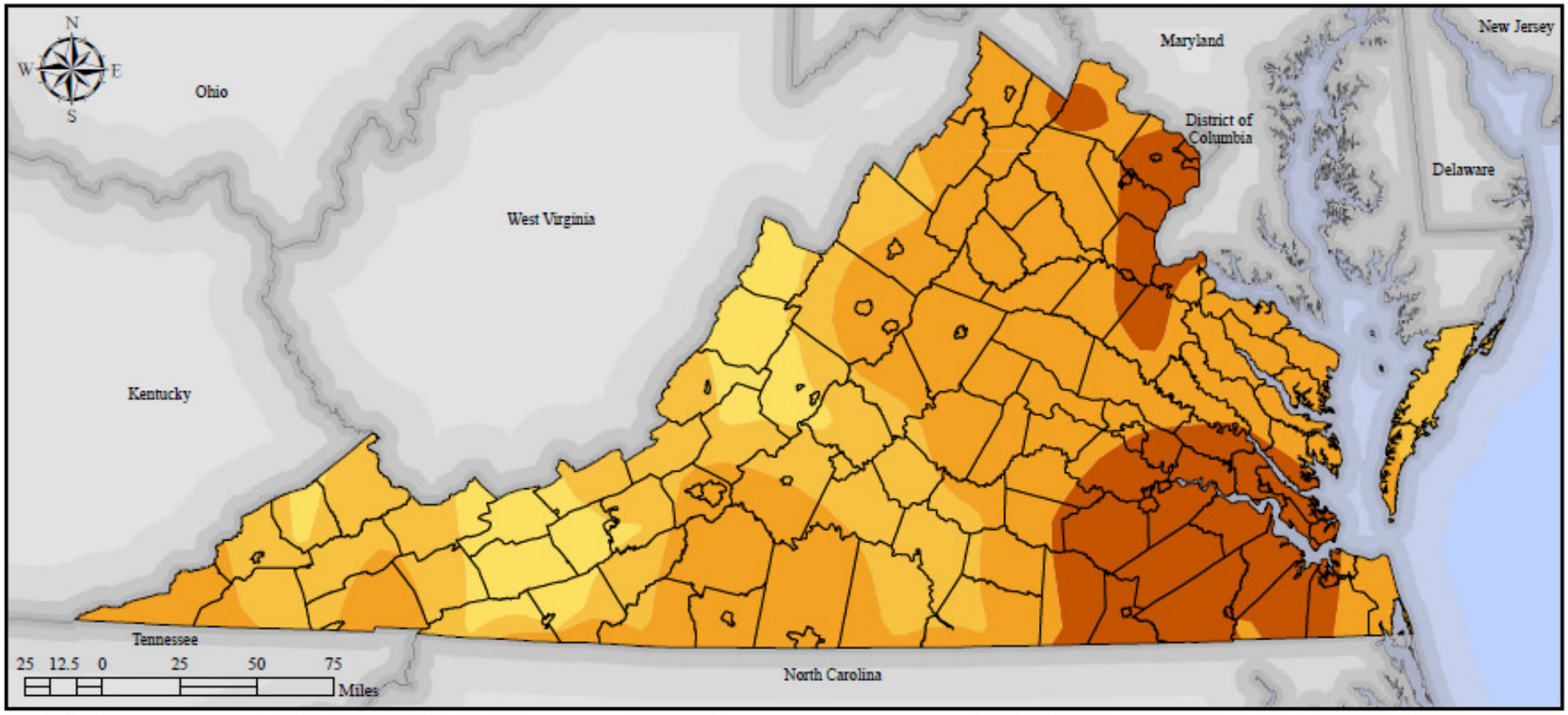
Tornadoes

- Historically, tornado intensity has been rated on the F-scale (now the EF-scale)
- Data Source: SVRGIS, a GIS dataset of tornado touchdowns and paths (1950 – 2009)
- No model of intensity-damage relationship available for use in loss estimates

FUJITA SCALE			ENHANCED FUJITA SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85
1	73-112	79-117	1	86-110
2	113-157	118-161	2	111-135
3	158-207	162-209	3	136-165
4	208-260	210-261	4	166-200
5	261-318	262-317	5	Over 200



Tornado Hazard Frequency



DATA SOURCES:
SVRGIS / SeverePlot
VGIN Jurisdictional Boundaries
ESRI State Boundaries

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

LEGEND:

Annual Tornado Hazard Frequency
Times One Million

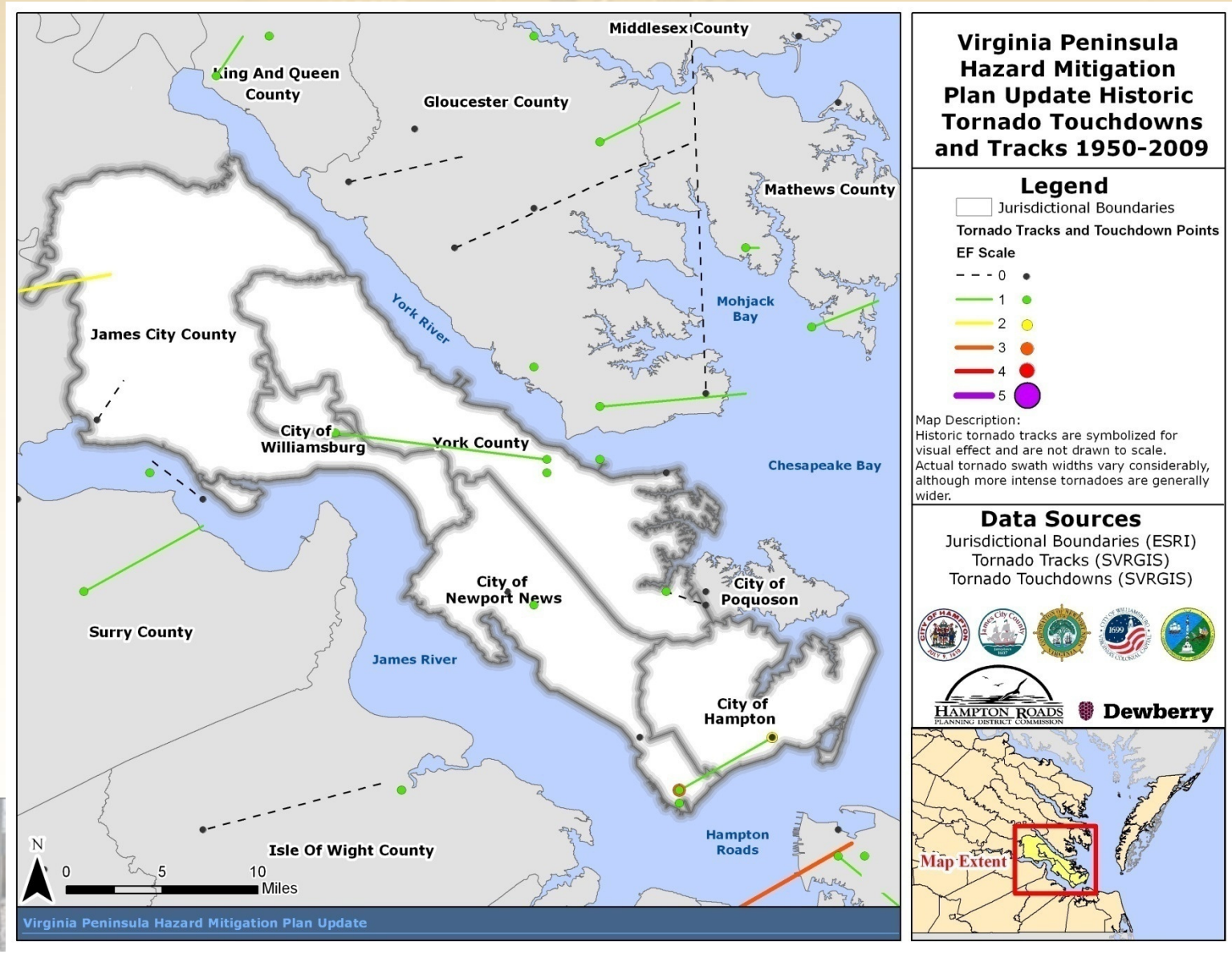
0 - 1.25	Low
1.251 - 10	Medium-Low
10.1 - 100	Medium-High
100.1 - 316	High

HAZARD IDENTIFICATION:

Annual tornado hazard frequency is an estimate of the frequency with which a point will experience a tornado, interpolating from neighboring tornado impact areas over the period of record. This map shows hazard frequency of any intensity of tornado. Note that "high" frequency in the state of Virginia is still rather low in comparison to many midwestern and southern states.

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

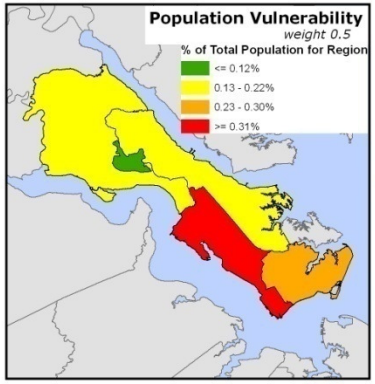
Historic Tornadoes

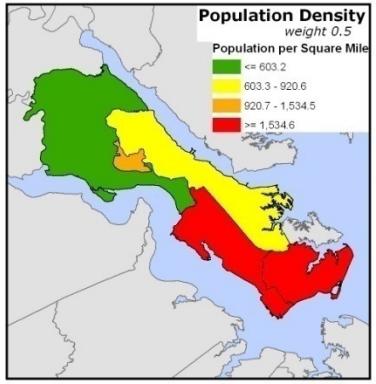


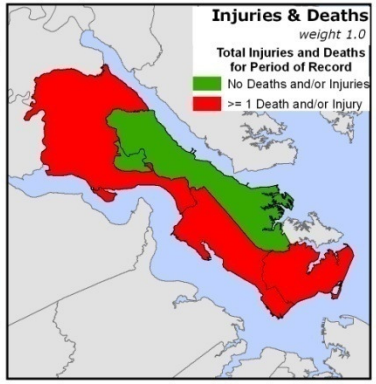
Tornado Loss

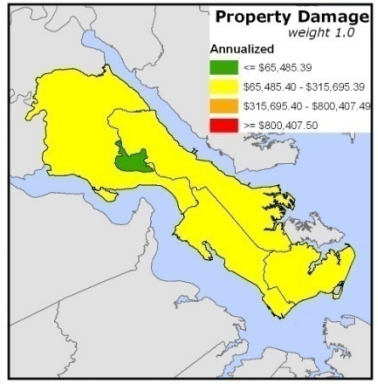
Annualized Tornado Impacts				
Jurisdiction	**NCDC Raw Total Losses (Property plus crop loss)**	**NCDC Total Annualized Losses (Property plus crop loss)**	**NCDC Annualized Property Losses**	**NCDC Annualized Crop Losses**
James City County	$11,543,578.96	$195,653.88	$195,653.88	$0
York County	$3,863,642.26	$65,485.46	$65,485.46	$0
City of Hampton	$10,853,093.45	$183,950.74	$183,950.74	$0
City of Newport News	$9,486,847.87	$160,794.03	$160,794.03	$0
City of Williamsburg	$0	$0	$0	$0
TOTAL	**$35,747,162.54**	**$605,884.11**	**$605,884.11**	**$0**

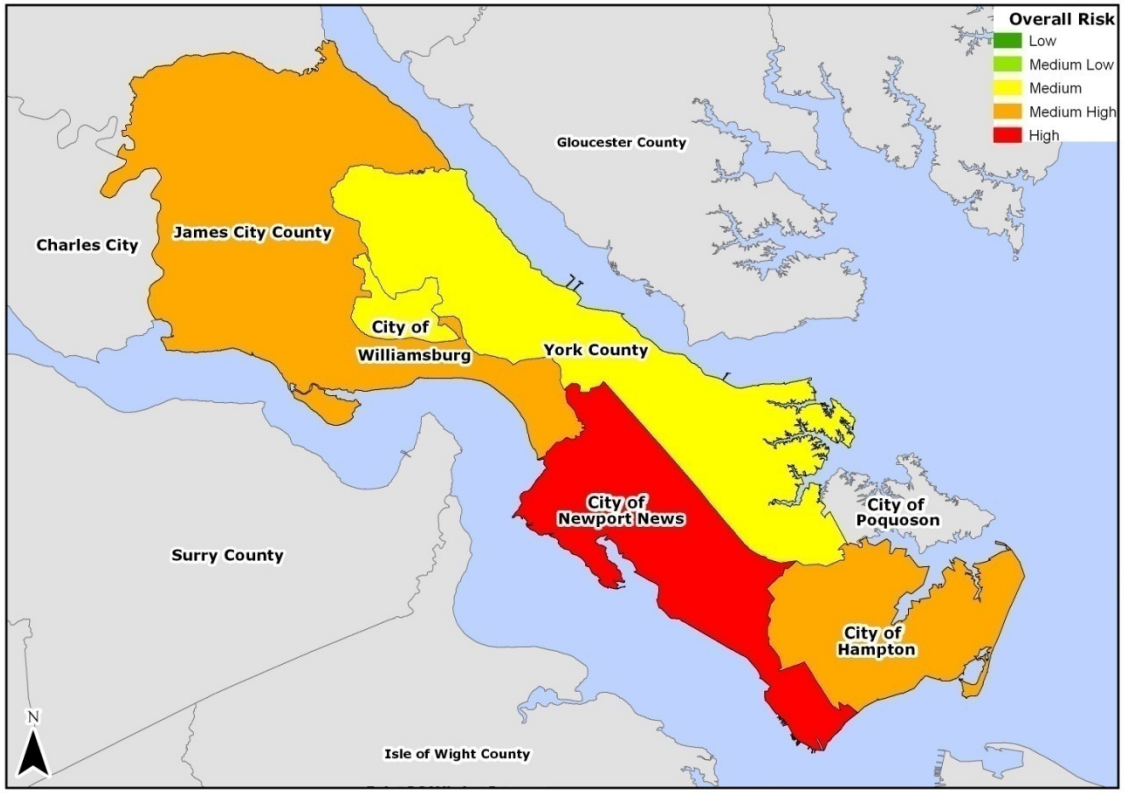
Tornado Hazard Ranking

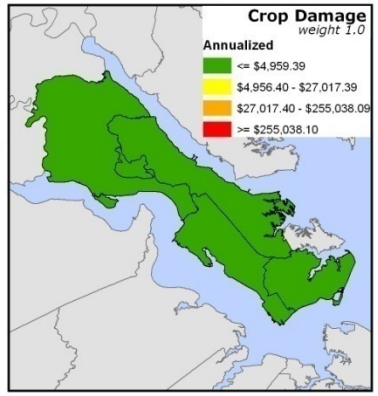


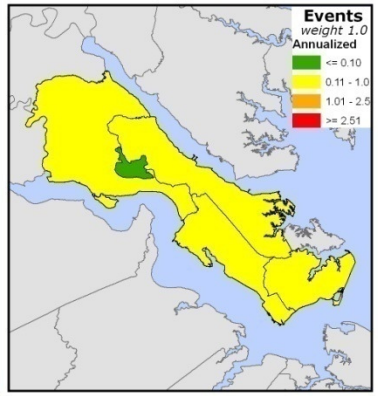


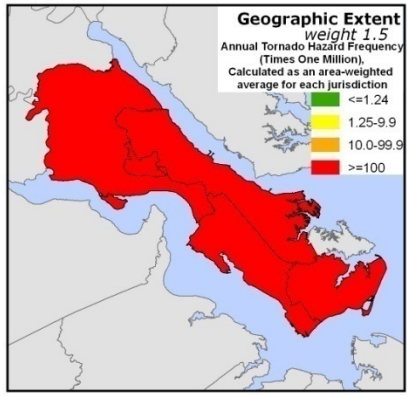












Virginia Peninsula Hazard Mitigation Plan Update Tornado Hazard Ranking Parameters and Risk Map

Hazard Ranking:

A number of factors have been considered in this risk assessment to be able to compare between jurisdictions and hazards. The factors have been added together to come up with the overall total ranking for each hazard.

Factors and Weighting Include:

-Population Vulnerability (PV) 0.5 weighting
-Population Density (PN) 0.5 weighting
-Injuries & Deaths (ID) 1.0 weighting
-Property Damage (PD) 1.0 weighting
-Crop Damage (CD) 1.0 weighting
-Annualized Events (EV) 1.0 weighting
-Geographic Extent (GE) 1.5 weighting

Risk = PV*0.5+PN*0.5+ID*1.0+PD*1.0+ CD*1.0+EV*1.0+GE*1.5

Data Sources:

Jurisdictional Boundaries (ESRI)
Hazard Data (NOAA NCDC [6/27/1951 - 7/29/2010])
Methodology (Adapted from Commonwealth of Virginia EOP 2010)

HAMPTON ROADS PLANNING DISTRICT COMMISSION

Dewberry

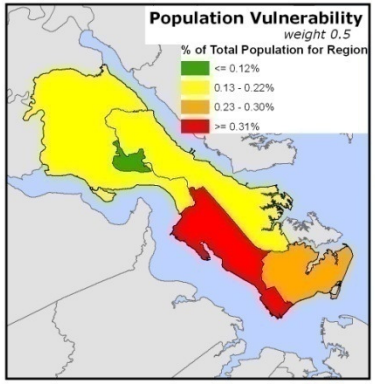
Significant Thunderstorms

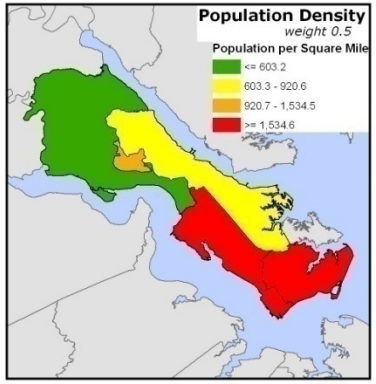
- **Impact**
  - Heavy rain/flooding
  - Hail
  - Wind gusts
  - Cloud-to-ground lightning strikes
  - Tornadoes
- **Vulnerability**
  - Utilities
  - Communication infrastructure
  - Humans

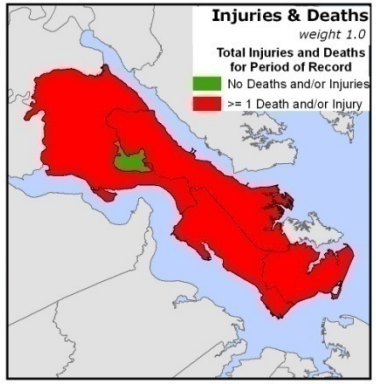
Significant Thunderstorms

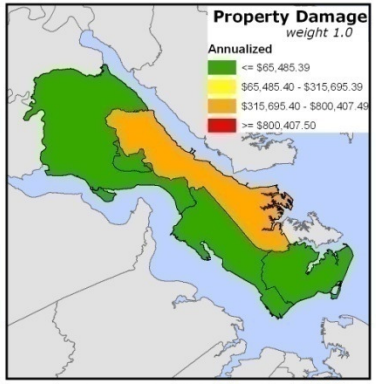
Significant Thunderstorm Impacts				
Jurisdiction	**NCDC Raw Total Losses (Property plus crop loss)**	**NCDC Total Annualized Losses (Property plus crop loss)**	**NCDC Annualized Property Losses**	**NCDC Annualized Crop Losses**
James City County	$1,673,373.22	$31,573.08	$26,616.63	$4,956.45
York County	$16,731,860.65	$315,695.48	$315,695.48	$0
City of Hampton	$1,427,038.49	$26,925.25	$26,925.25	$0
City of Newport News	$1,649,794.16	$31,128.19	$31,128.19	$0
City of Williamsburg	$81,892.41	$1,545.14	$1,545.14	$0
TOTAL	**$21,563,958.93**	**$406,867.15**	**$401,910.70**	**$4,956.45**

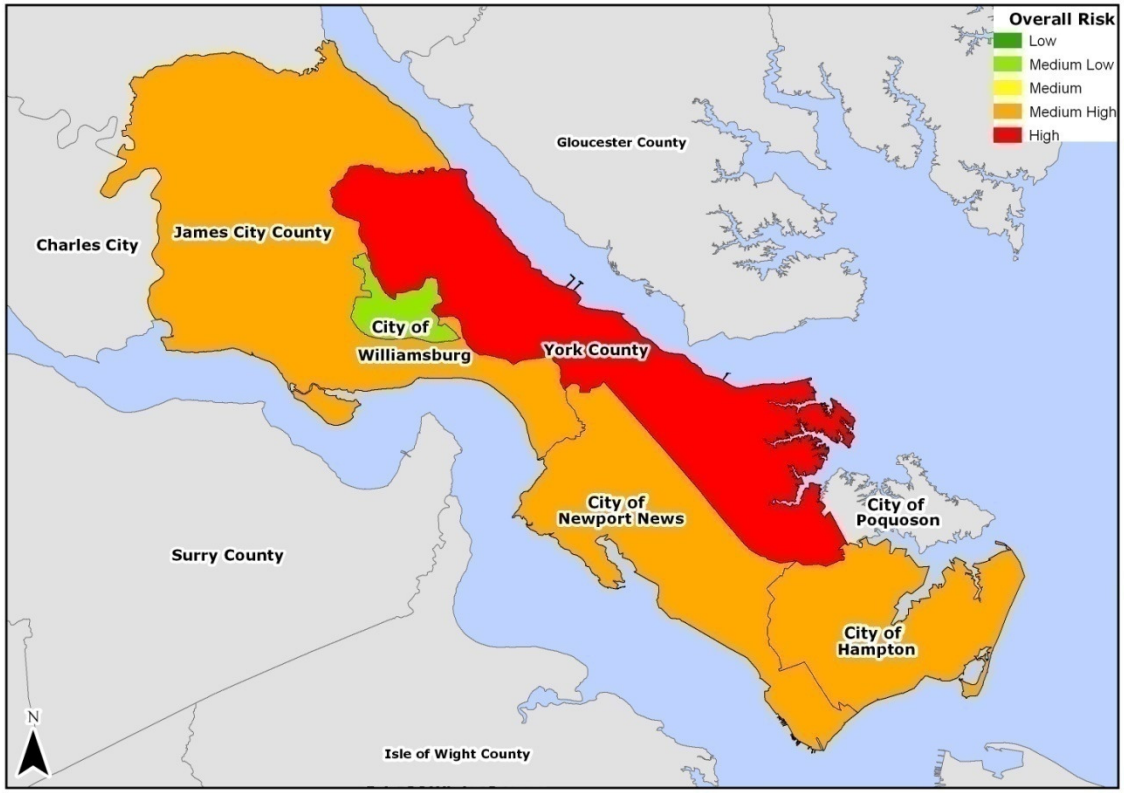
Significant Thunderstorm Hazard Ranking

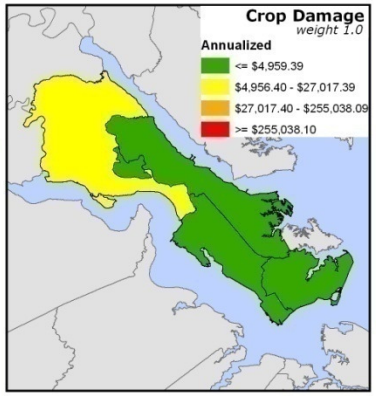


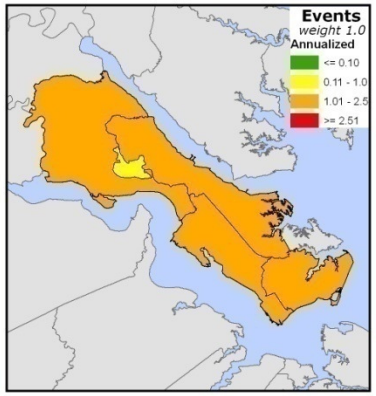


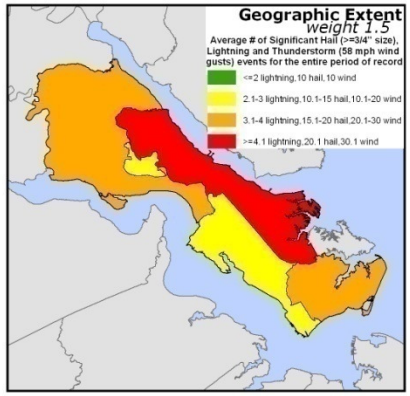












Virginia Peninsula Hazard Mitigation Plan Update Thunderstorm Hazard Ranking Parameters and Risk Map

Hazard Ranking:

A number of factors have been considered in this risk assessment to be able to compare between jurisdictions and hazards. The factors have been added together to come up with the overall total ranking for each hazard.

Factors and Weighting Include:

-Population Vulnerability (PV) 0.5 weighting
-Population Density (PN) 0.5 weighting
-Injuries & Deaths (ID) 1.0 weighting
-Property Damage (PD) 1.0 weighting
-Crop Damage (CD) 1.0 weighting
-Annualized Events (EV) 1.0 weighting
-Geographic Extent (GE) 1.5 weighting

Risk = PV*0.5+PN*0.5+ID*1.0+PD*1.0+ CD*1.0+EV*1.0+GE*1.5

Data Sources:

Jurisdictional Boundaries (ESRI)
Hazard Data (NOAA NCDC [6/27/1951 - 7/29/2010])
Methodology (Adapted from Commonwealth of Virginia EOP 2010)

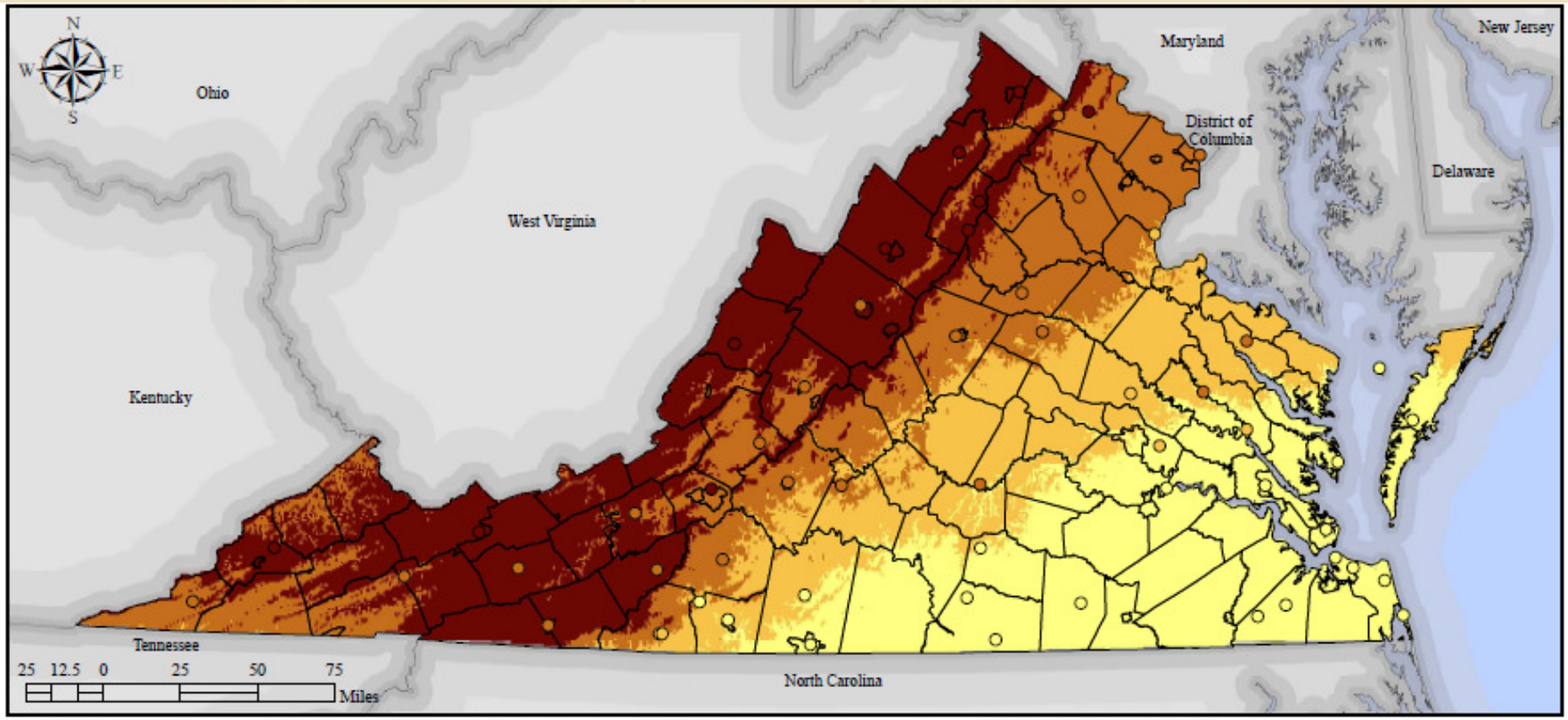
HAMPTON ROADS PLANNING DISTRICT COMMISSION

Dewberry

Winter Storm

- Impact and Vulnerability
  - Snow, sleet, freezing rain, wind, storm surge, extreme cold
  - Transportation agencies and utility companies
- VA HMP used weather station data to examine frequency of snowfall

Average # of Days ≥ 3 Inches of Snowfall



VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

DATA SOURCES:

CGIT analysis of NCDC data
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:

Avg. Number of Days per Year

- 1.5 or lower
- 1.51 - 2.0
- 2.01 - 3.0
- 3.01 - 6.72

HAZARD IDENTIFICATION:

Winter weather statistics were estimated from daily NCDC weather station reports from 1960 - 2000; the values at the weather stations are symbolized with small round dots, and a statewide regression fit depicts the overall trend in the weather station statistics.

These results depict general trends, and local conditions may vary widely.

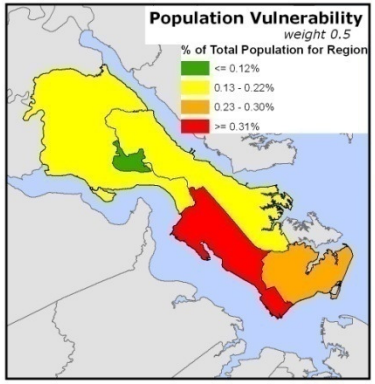
PROJECTION: *VA Lambert Conformal Conic North American Datum 1983*

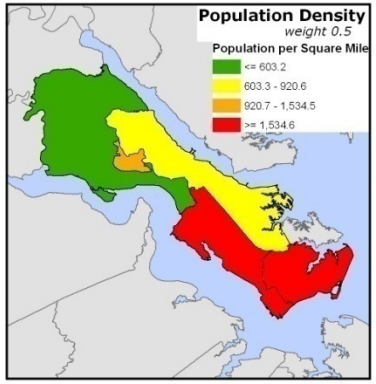
DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

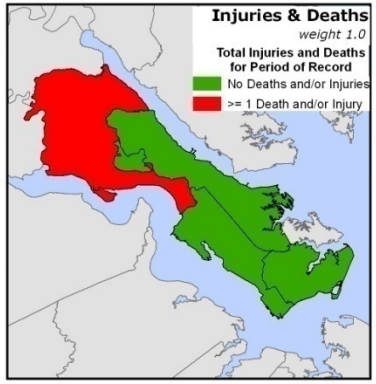
Winter Storm Loss

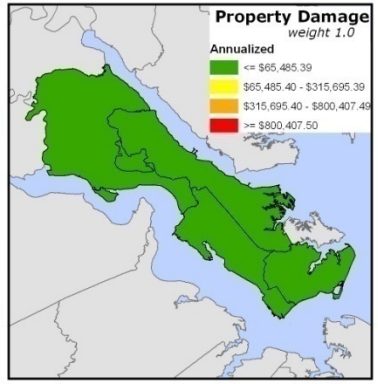
Winter Storm Impacts				
Jurisdiction	**NCDC Raw Total Losses (Property plus crop loss)**	**NCDC Total Annualized Losses (Property plus crop loss)**	**NCDC Annualized Property Losses**	**NCDC Annualized Crop Losses**
James City County	$650,079	$38,240	$38,240	$0
York County	$642,796	$37,812	$37,812	$0
City of Hampton	$642,796	$37,812	$37,812	$0
City of Newport News	$642,796	$37,812	$37,812	$0
City of Williamsburg	$642,796	$37,812	$37,812	$0
TOTAL	**$3,221,263**	**$189,488**	**$189,488**	**$0**

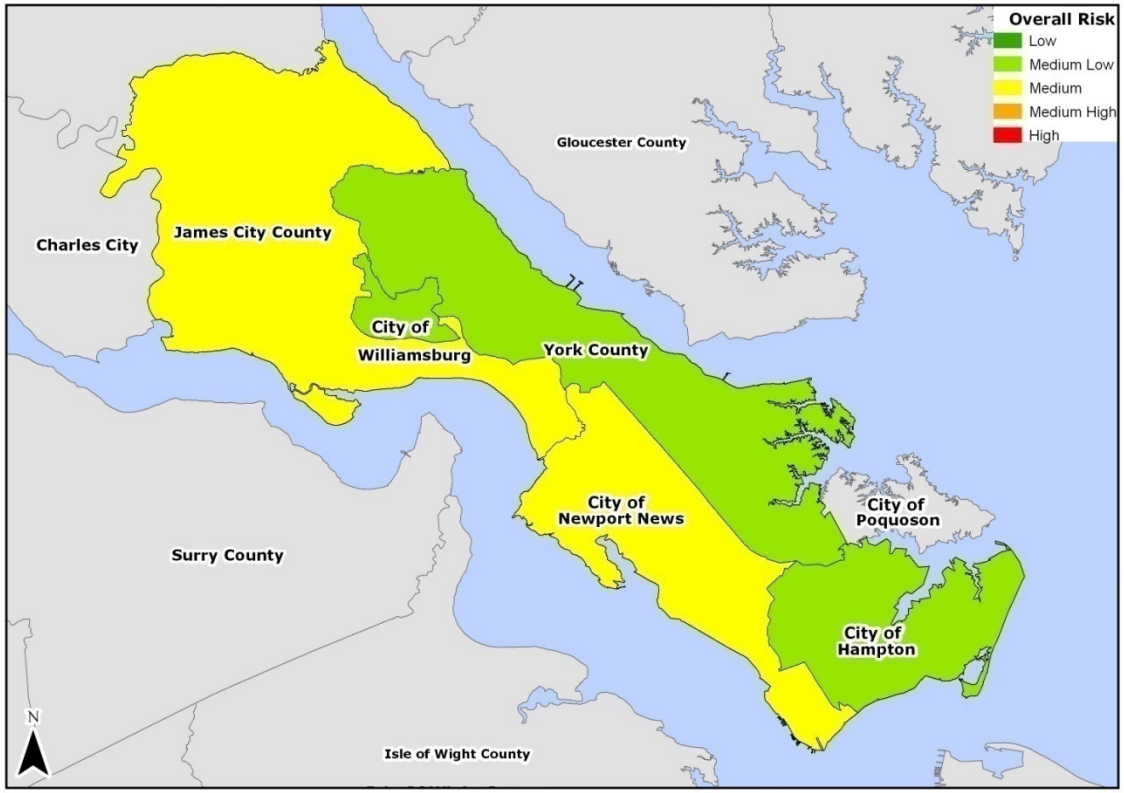
Winter Storm Hazard Ranking

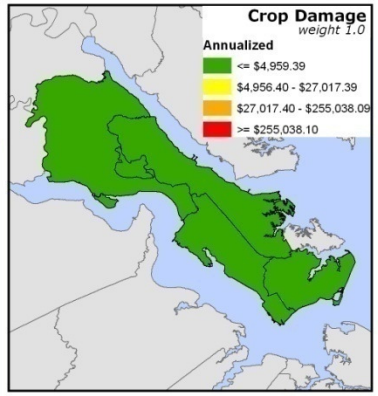


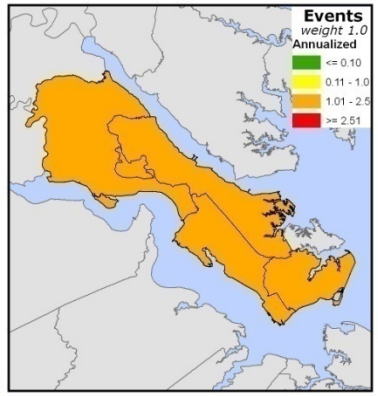


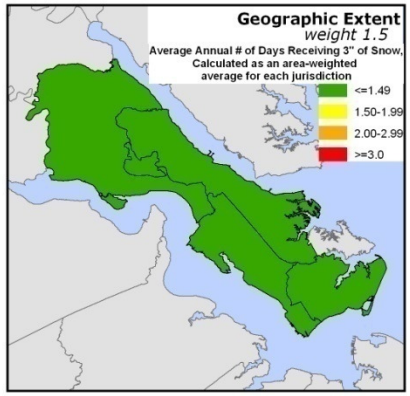












Virginia Peninsula Hazard Mitigation Plan Update
Winter Weather Hazard Ranking Parameters and Risk Map

Hazard Ranking:

A number of factors have been considered in this risk assessment to be able to compare between jurisdictions and hazards. The factors have been added together to come up with the overall total ranking for each hazard.

Factors and Weighting Include:

-Population Vulnerability (PV) 0.5 weighting
-Population Density (PN) 0.5 weighting
-Injuries & Deaths (ID) 1.0 weighting
-Property Damage (PD) 1.0 weighting
-Crop Damage (CD) 1.0 weighting
-Annualized Events (EV) 1.0 weighting
-Geographic Extent (GE) 1.5 weighting

Risk = PV*0.5+PN*0.5+ID*1.0+PD*1.0+ CD*1.0+EV*1.0+GE*1.5

Data Sources:

Jurisdictional Boundaries (ESRI)
Hazard Data (NOAA NCDC [6/27/1951 - 7/29/2010])
Methodology (Adapted from Commonwealth of Virginia EOP 2010)

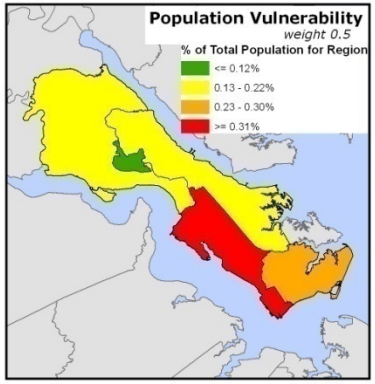
HAMPTON ROADS PLANNING DISTRICT COMMISSION

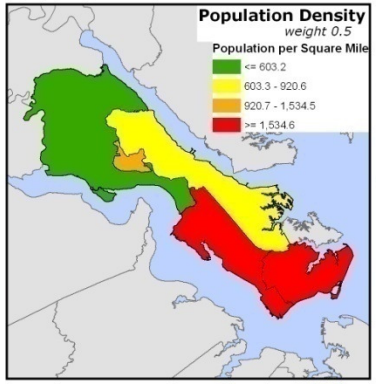
Dewberry

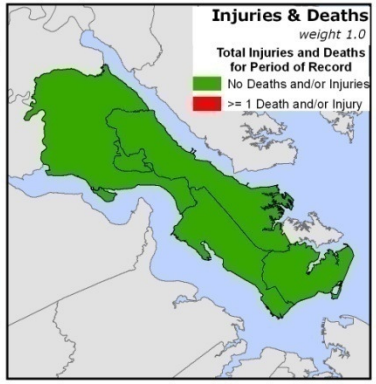
Drought Loss

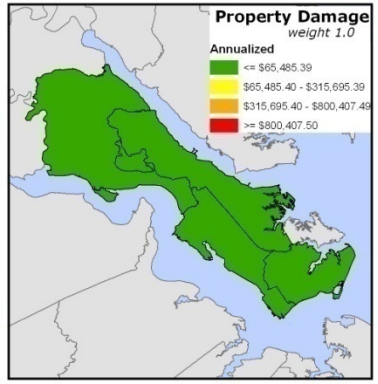
Annualized Drought Impacts			
Jurisdiction	**NCDC Raw Total Losses (Property plus crop loss)**	**NCDC Annualized Property Losses**	**NCDC Annualized Crop Losses**
James City County	$4,335,647.19	$0	$255,038.07
York County	$7,464.06	$0	$439.06
City of Hampton	$7,464.06	$0	$439.06
City of Newport News	$7,464.06	$0	$439.06
City of Williamsburg	$7,464.06	$0	$439.06
TOTALS	**$4,365,503.43**	**$0**	**$256,794.31**

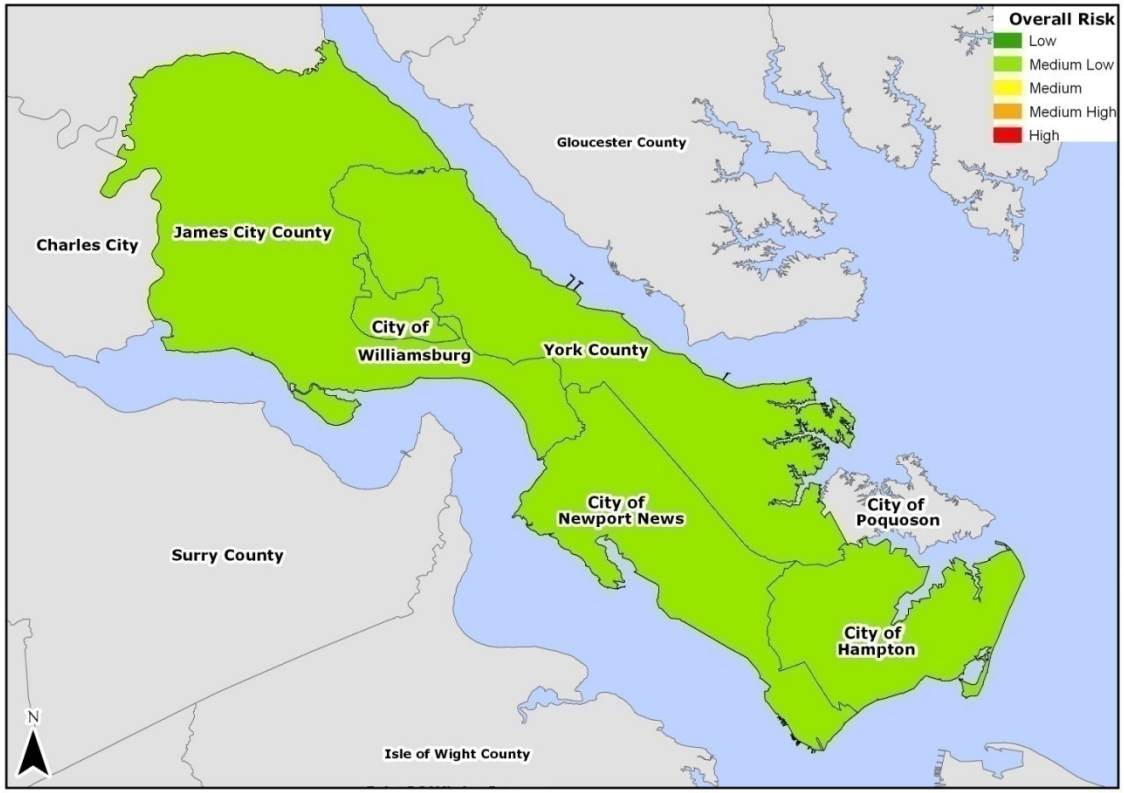
Drought Hazard Ranking

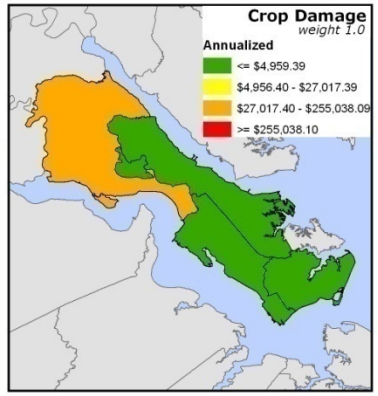


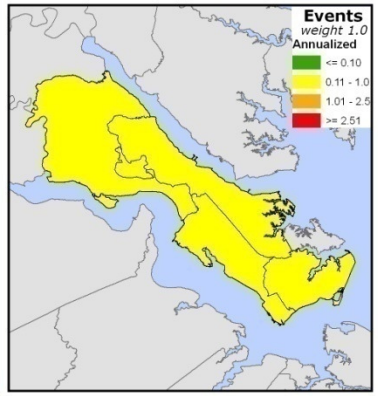


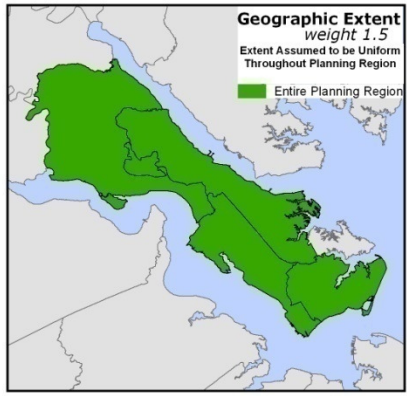












Virginia Peninsula Hazard Mitigation Plan Update
Drought Hazard Ranking Parameters and Risk Map

Hazard Ranking:

A number of factors have been considered in this risk assessment to be able to compare between jurisdictions and hazards. The factors have been added together to come up with the overall total ranking for each hazard.

Factors and Weighting Include:

-Population Vulnerability (PV) 0.5 weighting
-Population Density (PN) 0.5 weighting
-Injuries & Deaths (ID) 1.0 weighting
-Property Damage (PD) 1.0 weighting
-Crop Damage (CD) 1.0 weighting
-Annualized Events (EV) 1.0 weighting
-Geographic Extent (GE) 1.5 weighting

Risk = PV*0.5+PN*0.5+ID*1.0+PD*1.0+ CD*1.0+EV*1.0+GE*1.5

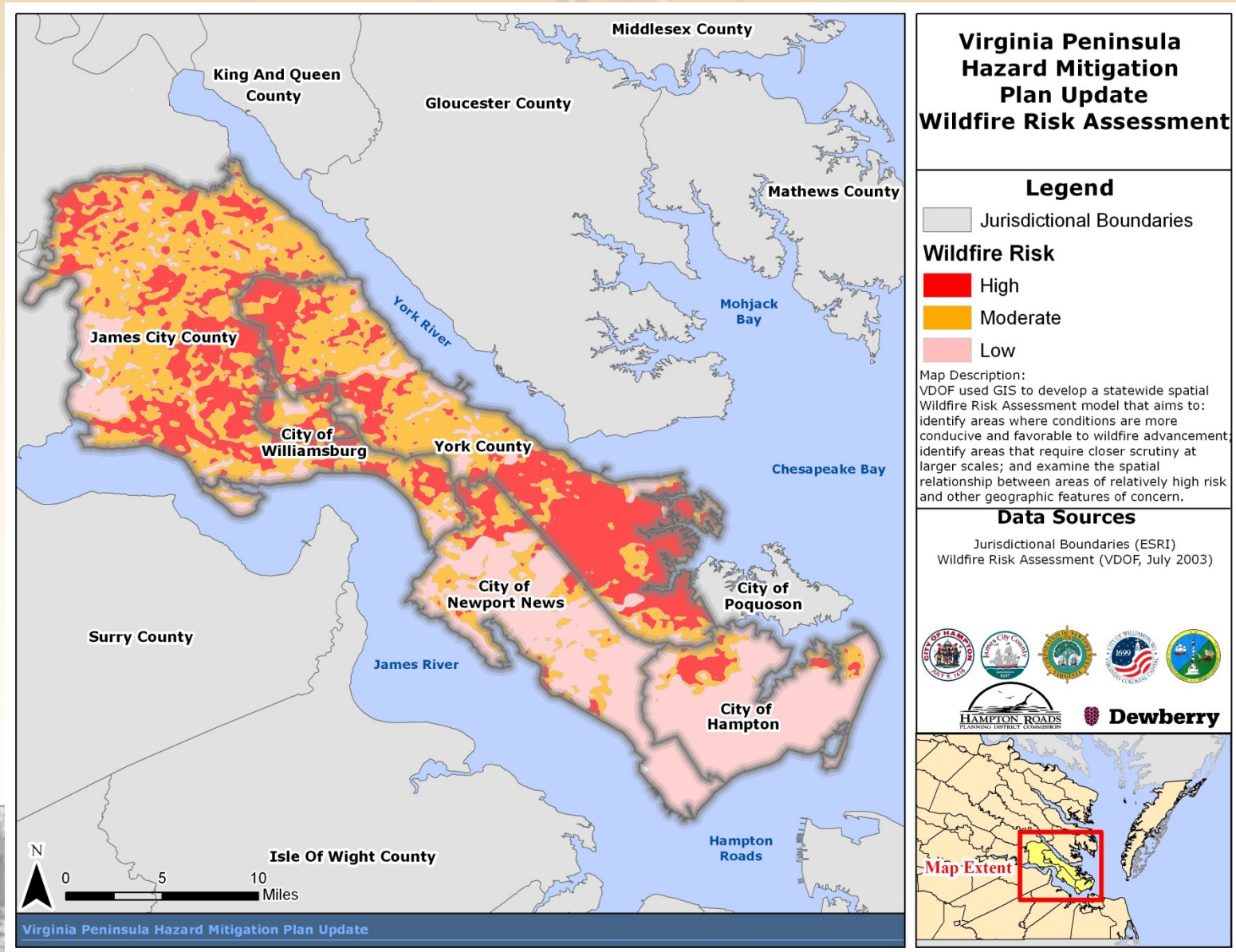
Data Sources:

Jurisdictional Boundaries (ESRI)
Hazard Data (NOAA NCDC [6/27/1951 - 7/29/2010])
Methodology (Adapted from Commonwealth of Virginia EOP 2010)

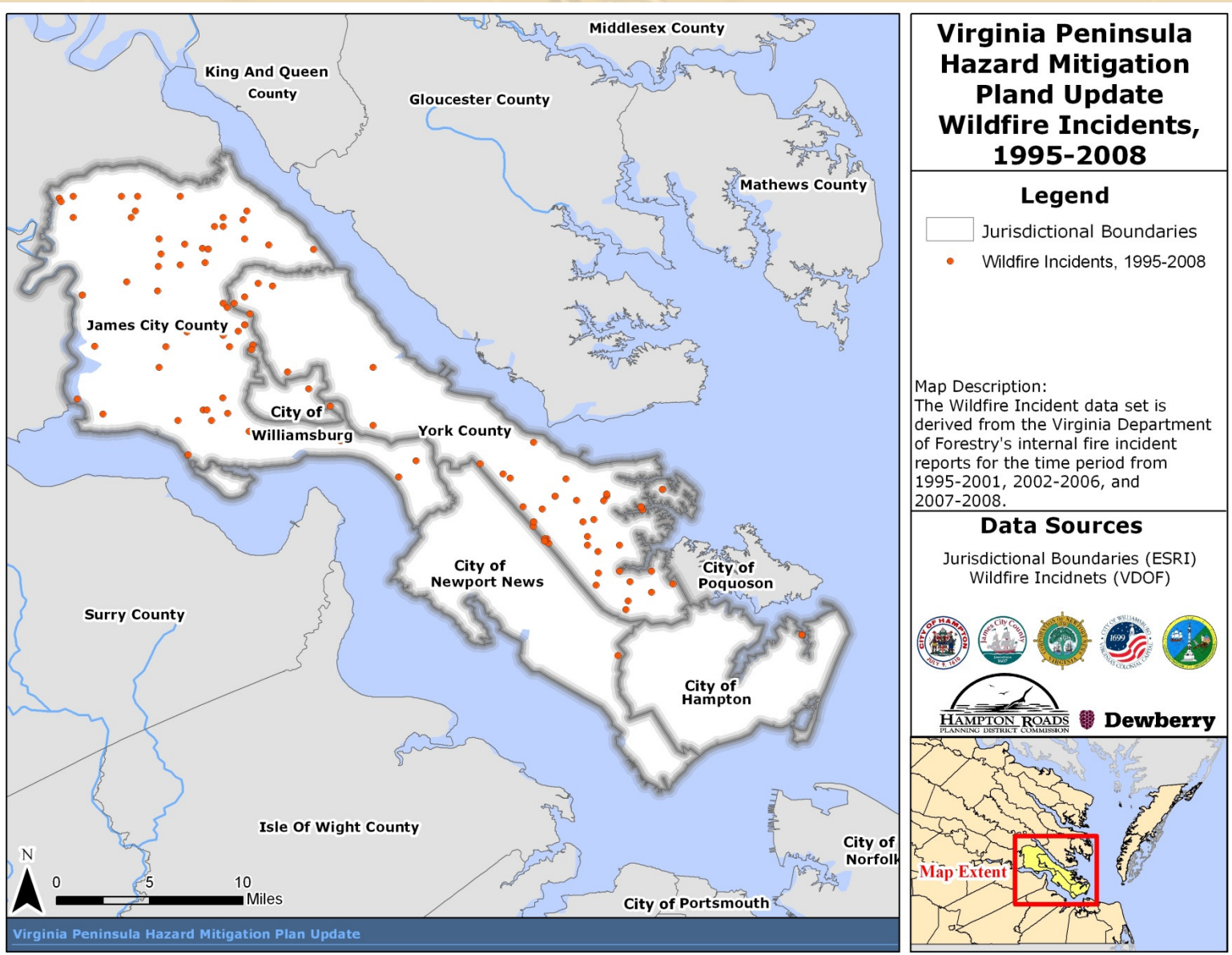
HAMPTON ROADS PLANNING DISTRICT COMMISSION

Dewberry

Wildfire Risk



Wildfire Incidents



Wildfire

Leading Causes of Wildfires on the Peninsula, 1995-2008. Source: VDOF		
Cause	**# of Fires**	**% of Wildfires**
Incendiary	**32**	**29%**
Children	**22**	20%
Debris Burning	**19**	17%
Miscellaneous	**11**	10%
Campfire	**8**	7%
Smoking	**6**	5%
Lightning	**4**	4%
Equipment Use	**4**	4%
Unknown	**2**	2%
Railroad	**2**	2%

Wildfire Events in the Peninsula Region, 1995-2008 Source: VDOF			
Jurisdiction	**Number of Fires**	**Total Acres**	**Total Damages**
City of Hampton	2	13.2	$0
James City County	58	42.5	$650
City of Newport News	1	6.5	$0
City of Williamsburg	2	0	$0
York County	47	108.7	$11,750
TOTAL	**110**	**170.9**	**$12,400**

Wildfire

- No NCDC wildfire events for the Peninsula
- Ranking methodology not applied
- Wildfire hazard considered to be 'Medium' for each jurisdiction in the Peninsula planning region
  - Same as 2006 plan
  - Based on analysis of available data

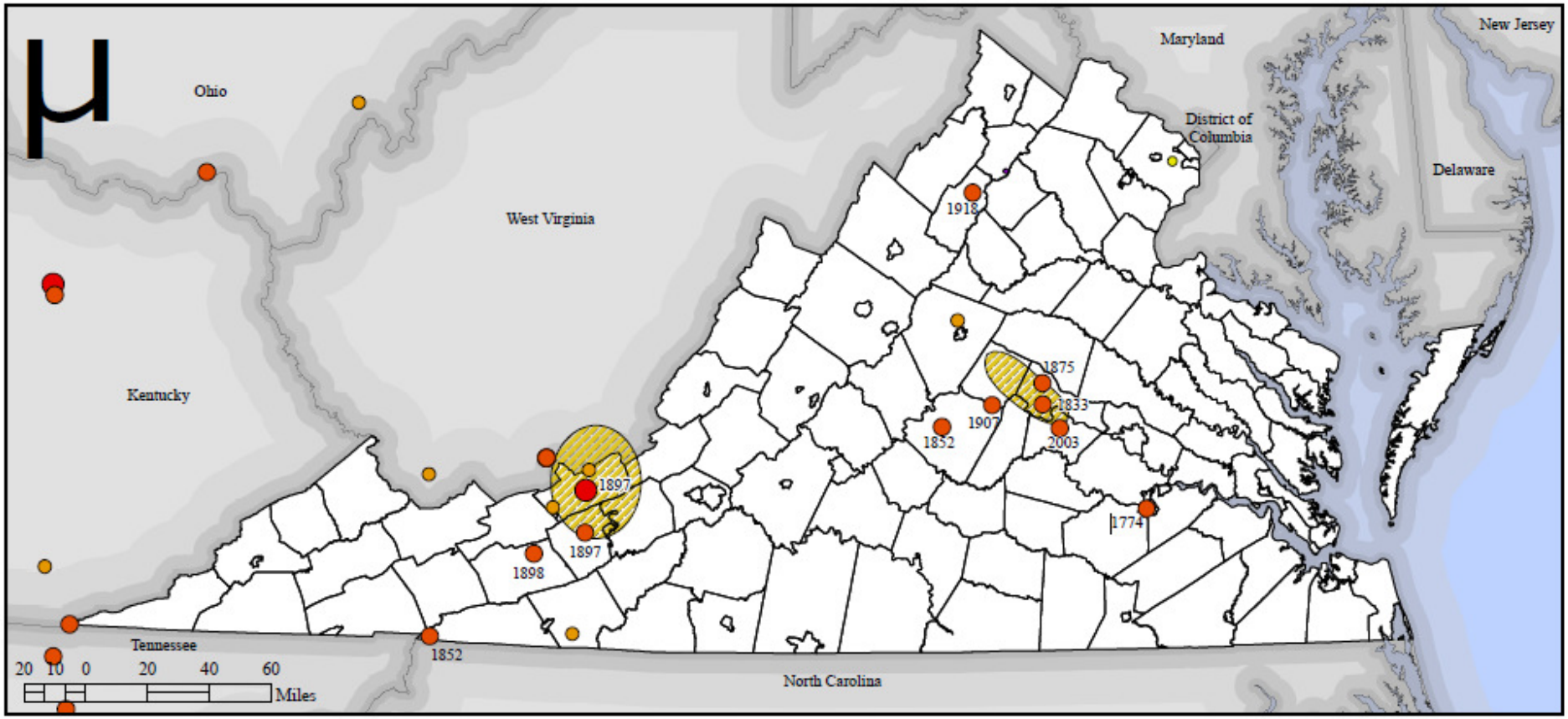
Earthquake

- Various visual & spatial representations of historical earthquakes and seismic hazard zones exist.
  - HAZUS Earthquake Module
  - USGS Significant Earthquake Locations
  - USGS Quaternary Fault Zones
  - Peak Ground Acceleration Mapping
- FEMA's HAZUS Earthquake module estimates damage and loss to buildings, lifelines and critical facilities.

No NCDC records for Earthquake in the Peninsula

Virginia Earthquakes

Figure 3.13-1: Significant Earthquakes 1568 - 2004*



VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

PROJECTION: *VA Lambert Conformal Conic North American Datum 1983*

DATA SOURCES:

USGS Significant Earthquakes
USGS Quaternary Faults
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:

Richter Magnitude
- Unknown
- 1 - 2.9
- 3 - 3.9
- 4 - 4.9
- > 5

Quaternary Faults/Folds

HAZARD IDENTIFICATION:

This map layer contains the locations of significant, historic earthquakes that caused deaths, property damage, and geological effects, or were otherwise experienced by populations in the United States (1568 - 2004).
USGS Quaternary Faults and Folds are believed to be sources of earthquakes, greater than magnitude 6, in the past 1,600,000 years.
*The 2008 Annandale event has been added to this map for comparison to Table 3.13-2.

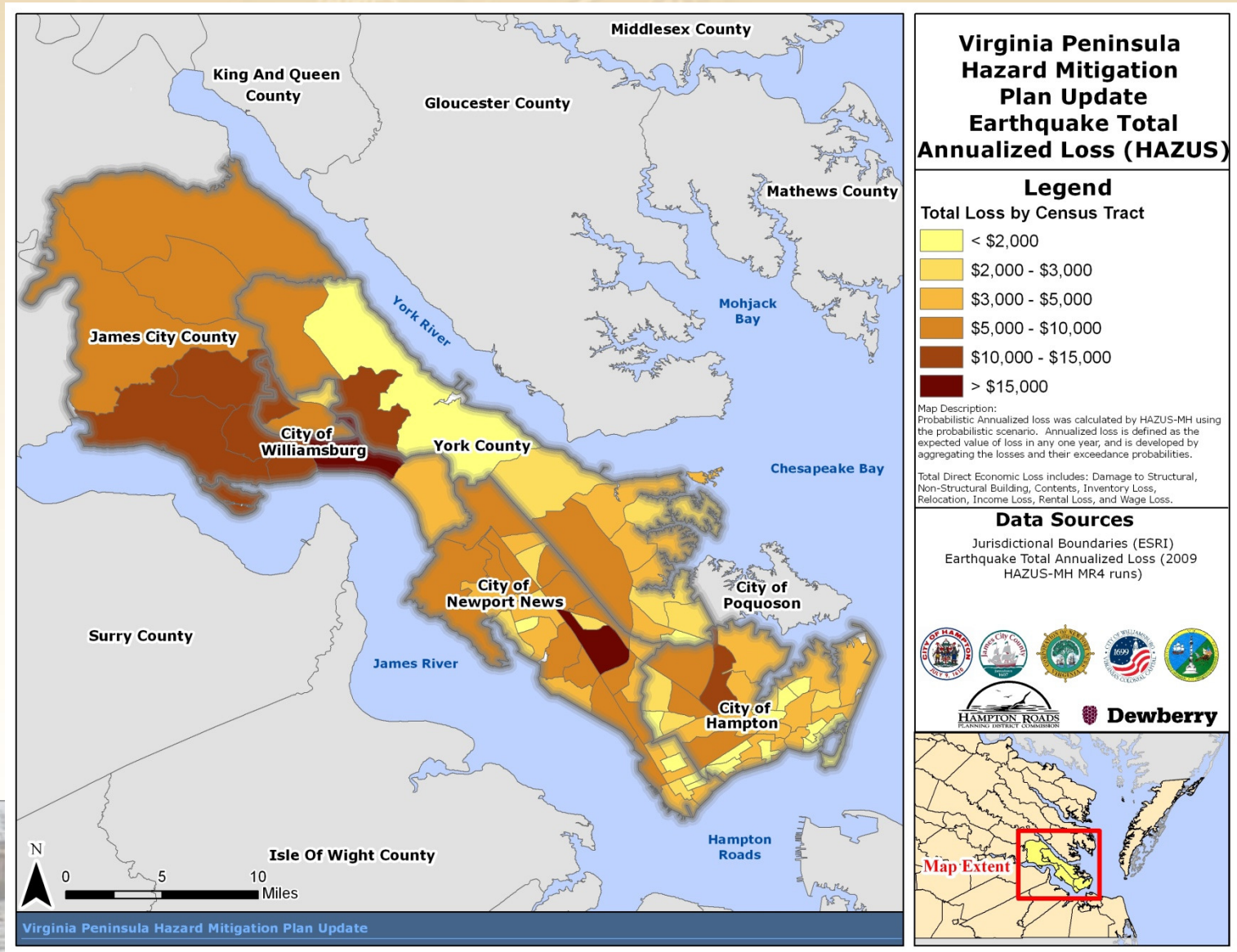
DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Earthquake Loss

HAZUS Annualized Loss for Earthquake	
Jurisdiction	**Annualized Loss***
City of Newport News	$166,376
City of Williamsburg	$26,181
Hampton	$100,124
York County	$55,830
James City County	$79,792
Region Total	**$428,303**
Virginia Total	**$17,429,103**

**Source: 2010 Commonwealth of Virginia Emergency Operations Plan*

Earthquake Loss



OVERALL RISK

- NCDC county/city hazard rankings are relative to the Peninsula planning region
- Jurisdictional risk ranking and analysis is more comprehensive than the 2006 version, but it is still limited by underlying biases/flaws in the source data
- The analyses of critical facilities were limited by little (or no) building-specific parameters necessary to quantify vulnerability
- Potential resolutions of limitations in the hazard profiles and risk assessments may be included in 2011 mitigation strategies

Overall Hazard Ranking

Jurisdiction	Flood	Thunderstorm	Tornado	Tropical Storm / Hurricane	Winter Weather	Drought	Wildfire	Earthquake	Landslide & Expansive Soils	Biological / Epidemics
James City County	Med-High	Med-High	Med-High	High	Med	Med-Low	Med	Low	Low	Low
York County	Med-High	High	Med	High	Med-Low	Med-Low	Med	Low	Low	Low
City of Hampton	Med-High	Med-High	Med-High	High	Med-Low	Med-Low	Med	Low	Low	Low
City of Newport News	Med-High	Med-High	High	High	Med	Med-Low	Med	Low	Low	Low
City of Williamsburg	Med	Med-Low	Med	High	Med-Low	Med-Low	Med	Low	Low	Low
OVERALL RESULTS	**Med-High**	**Med**	**Med-High**	**High**	**Med-Low**	**Med-Low**	**Med**	**Low**	**Low**	**Low**

Annualized Loss

Requirement § 201.6(c)(2)(ii)(B): *[The plan* ***should*** *describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate . . . .*

Hazard Ranking and Annualized Loss

2011 Ranking	2011 Hazard Classification	Annualized Loss from NCDC	Annualized Loss from Other Sources	Data Source
High	Hurricane/Tropical Storm	$14,337,167	$9,666,524	FEMA HAZUS MH MR4
Med-High	Flood	$2,746,425	$94,507,000	FEMA HAZUS MH MR4
Med-High	Tornado	$605,884		
Medium	Thunderstorm	$406,867		
Med-Low	Winter Weather	$189,486		
Med-Low	Drought (Extreme Heat)	$256,794		
Medium	Wildfire	$0	$12,400	
Low	Earthquake	$0	$428,303	FEMA HAZUS MH MR4
Low	Landslides & Expansive Soils	$0	N/A	
Low	Biological/Epidemics	$0	N/A	

NCDC Annualized Loss

Annualized Loss (based on property and crop damages and number of years of record)							
Jurisdiction	**Flood**	**Significant Thunderstorm**	**Tornado**	**Hurricane**	**Winter**	**Drought**	**Totals**
James City County	$57,412	$31,573	$195,654	$2,629,539	$38,240	$255,038	$3,207,456
York County	$800,408	$315,695	$65,485	$2,926,931	$37,812	$439	$4,146,770
City of Hampton	$560,234	$26,925	$183,951	$2,926,883	$37,812	$439	$3,736,244
City of Newport News	$532,558	$31,128	$160,794	$2,926,883	$37,812	$439	$3,689,614
City of Williamsburg	$795,813	$1,545	$0	$2,926,931	$37,812	$439	$3,762,540
Totals	**$2,746,425**	**$406,867**	**$605,884**	**$14,337,167**	**$189,486**	**$256,794**	**$18,542,623**

Human-Caused Hazards Profiled

- Anthrax
- Improvised Explosive Devices
- Hazardous Materials Releases
- Nuclear/Radiological Releases
- Utility Failure (Electrical, Water/Wastewater, and Telecommunications)
- Infrastructure Failure (Bridges)

Human-Caused Hazard Research Approach

- Accident, Crime, Terrorism
  - Motivations behind each very different
  - Impacts are similar
- Overview and Previous Occurrences
  - Data sources:
    - CDC, FEMA, U.S. Army, U.S. Air Force, WHO, NRC, EPA, ASCE, Code of Federal Regulations, etc.

Human-Caused Hazard Research Approach

- Vulnerability and Impacts
  - Entire region vulnerable to all of these hazards
- Risk
  - Utility and Bridge Failure approximated using FEMA Benefit Cost Analysis software
  - Not quantified for other manmade hazards

Human-Caused Hazard Ranking Methodology

- Vulnerability
  - High (1 point)
  - Low (0 points)
- Historical Precedence
  - No Previous U.S. Occurrences (0 points)
  - Previous U.S. Occurrences (3 points)
  - Previous Peninsula Occurrences (5 points)

Human-Caused Hazard Ranking Methodology

- Impact Zone

General Impact	Radii of impact, mi (ft)	Impact Score
Very Small	0.25 (1,298)	1
Small	1.2 (6,090)	2
Medium	1.8 (9,722)	3
Large	4.4 (23,308)	4

Human-Caused Hazard Ranking Methodology

- Points added together and totaled for overall ranking

Hazard Ranking by Score	
1 to 4	Low
5 to 7	Moderate
8 to 10	High

Manmade Manmade Hazard Rankings

Hazard	Vulner-ability		Historical Precedence			Impact Zone				Total Score
	Low (0)	High (1)	None (0)	US (3)	Region (5)	VS (1)	S (2)	M (3)	L (4)	
Anthrax Release	0		3			3				**6 Moderate**
IED	1		5			2				**8 High**
Hazardous Material Release	0		5			3				**8 High**
Nuclear/Radiological Release	0		3			4				**7 Moderate**
Utility Failure	1		5			2				**8 High**
Infrastructure Failure	1		5			2				**8 High**

Overall Hazard Ranking

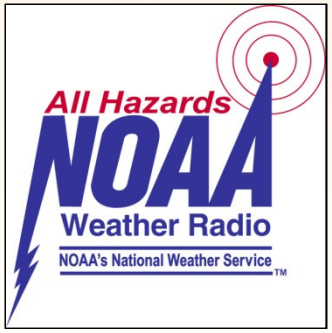
Jurisdiction	Flood	Thunderstorm	Tornado	Tropical Storm / Hurricane	Winter Weather	Drought	Wildfire	Earthquake	Landslide & Expansive Soils	Biological / Epidemics
James City County	Med-High	Med-High	Med-High	High	Med	Med-Low	Med	Low	Low	Low
York County	Med-High	High	Med	High	Med-Low	Med-Low	Med	Low	Low	Low
City of Hampton	Med-High	Med-High	Med-High	High	Med-Low	Med-Low	Med	Low	Low	Low
City of Newport News	Med-High	Med-High	High	High	Med	Med-Low	Med	Low	Low	Low
City of Williamsburg	Med	Med-Low	Med	High	Med-Low	Med-Low	Med	Low	Low	Low
OVERALL RESULTS	**Med-High**	**Med**	**Med-High**	**High**	**Med-Low**	**Med-Low**	**Med**	**Low**	**Low**	**Low**

Jurisdictional Risk (RS) Formula:

RS = (0.5*(PV + PN)) + ID + EV + PD + CD + (1.5*GE)

Using the HIRA Results

- Creating Mitigation Actions
  - What is the HIRA telling us?
  - Current Projects?
  - Potential Funding Sources?



Workshop Definitions

- ***Goal:*** **general guidelines that describes what Peninsula planning region would like to achieve**
- ***Objective:*** **specific and measurable strategies that must be implemented to achieve the identified goals**
- ***Action:*** **more specific than an objective with identified responsible parties, timeframes, and potential funding sources**

2006 Regional Goals and Objectives – Updated 1/28/11

- **Goal 1: Reduce impacts and losses from all hazards**
  - **Objective 1.1: Minimize exposure of re-development as well as new development from likely hazard impacts**
  - **Objective 1.2: Strengthen community Floodplain Management programs**
  - **Objective 1.3: Strengthen community Emergency Management programs**

2006 Regional Goals and Objectives – Updated 1/28/11

- **Goal 2: Promote awareness of hazards and vulnerability among citizens, business, visitors, industry and government**
  - **Objective 2.1: Develop a seasonal multi-hazard public education campaign to be implemented annually**
  - **Objective 2.2: Manage expectations for residential mitigation grant availability.**
  - **Objective 2.3: Develop targeted campaigns to address flood and hurricane hazard risks including public awareness and personal preparedness responsibility.**

2006 Regional Goals and Objectives – Updated 1/28/11

- **Goal 3: Maximize use of available funding**
  - **Objective 3.1: Maintain FEMA Eligibility**
  - **Objective 3.2: Identify, analyze and establish Mitigation project cost share options**

Next Steps

- Public Website Goes Live
- Reporting on 2006 Plan Accomplishments
- Comments February 4; Finalize HIRA
- Finalize Jurisdictional Meetings February 23-25
    - Yo

Peninsula Hazard Mitigation Plan Update HIRA Results Presentation
Sign-in Sheet

Initials	Name	Department/Organization	Phone	E-mail
RT	Ryan Towell	Dewberry	(703) 849-0275	rtowell@dewberry.com
RC	Robbie Coates	VDEM	804 897-9576	robert.coates@vdem.virginia.gov
KD	Ken Dierks	Kimley-Horn	757. 548.7306	ken.dierks@kimley-horn.com
DM	Deborah Mills	Dewberry	7038490162	dmills@dewberry.com
RPL	R. Paul Long	York County	757-898-8362	longr@yorkcountygov.gov
CJS	Curt Shaffer	Hampton	757 7274067	cshaffer@hampton.gov
KJ	Ken Jones	Newport News	(757) 269-2900	KJONES@NNGOV.com
RF	Rich Flannery	HRPDC	757-420-8300	RFLANNERY@HRPDCVA.gov
NE	Natalie Easterday	HRPDC	757-420-8300	neasterday@hrpdcva.gov
KH	Kathleen Hale	James City County	757-~~565~~ 564 2141	khale@james-city.va.us
SR	Sara Ruch	Hampton	757-262-7304	sruch@hampton.gov
TH	Tracy Hanger	Hampton	757-727-2288	thanger@hampton.gov

Peninsula Hazard Mitigation Plan Update

Conference Call #1

OCTOBER 20, 2010 • 11:00AM – 12:00PM EST • TELECON

Purpose:

1. Verify project schedule with Committee.
2. Engage the Committee in a conversation to discuss expectations and content of the public outreach website.
3. Conduct a problem spot analysis.
4. Gain a better understanding of how to incorporate utilities into the HIRA.
5. Discuss January/February jurisdiction meeting schedules.

TIME	TOPIC	FACILITATOR
11:00 – 11:05 AM	Project Overview and Schedule	Deb Mills
11:05 – 11:20 AM	Public Outreach Website	Deb Mills, Kamran Beig
11:20 - 11:35 AM	Problem Spot Analysis	Rachael Herman, Ryan Towell
11:35 – 11:50 AM	Utilities	Rachael Herman, Ryan Towell
11:50 – 11:55 AM	Meeting Schedule	Deb Mills
11:55 – 12:00 PM	Alternate Points of Contacts, Next Steps and Adjourn	Deb Mills

Audio Call in:
1.888.330.9552
Committee Members: 1042738#
Host (Mills or Speranza): 1034533#

Attendees:

-

Specific Questions to Discuss with Committee:

Peninsula Mitigation Plan Update Kick Off Meeting
October 20, 2010 Sign-in Sheet

Name	Department/Organization	Phone	Fax	E-mail
Rich Flannery	HRPDC	757.420.8300		rflannery@hrpdcva.gov
Paul Long	York County	890.3600		longr@yorkcounty.gov
Curt Shaffer	Hampton EM	757.727.6067		cshaffer@hamptonva.gov
Sara Ruch	Hampton EM	757.262.7304		sruch@hamptonva.gov
Tracy Hanger	Hampton Fire	757.727.2288		thanger@hamptonva.gov
Kate Hale	James City County EM			khale@james-city.va.us
Bob Gregory	Newport News EM			rwgregory@nngov.com
Natalie Easterday	HRPDC	757.420.8300		neasterday@hrpdcva.gov
Robert Lawrence	HRPDC	757.420.8300		rlawrence@hrpdcva.gov
Judi Frist-Riutort	Dewberry	703.849.0100		Jfrist-ruitort@dewberry.com
Deborah Mills	Dewberry	703.849.0100		dmills@dewberry.com
Carrie Speranza	Dewberry	703.849.0100		csperanza@dewberry.com
Rachael Herman	Dewberry	703.849.0100		Rherman@dewberry.com
Ryan Towell	Dewberry	703.849.0100		rtowell@dewberry.com

Agenda
Peninsula Hazard Mitigation Plan – Conference Call #2
March 24, 2011

Good Afternoon Folks:
It was great for our team to meet with your independent jurisdictions last month to discuss the hazard identification, risk assessment and vulnerability analysis. From there the discussion migrated to your old 2006 plan mitigation actions and strategies and then new work for the next 5 year cycle.
It is important now for us to gain closure as a team on the vulnerability analysis so that we can package it for submittal to VDEM to help expedite the plan approval. Several other agenda topics:

1. Finalization of local mitigation action plans;
2. Scheduling local outreach (public) meetings or other forums to make the plan accessible for comment;
3. Scheduling visits by our civil engineering team to any structures you wish evaluated for potential mitigation:
    a. Residences
    b. Stormwater management opportunities
    c. Lift stations
    d. Schools
    e. Public safety; fire, ems, police
    f. Other government or non-governmental buildings or infrastructure

    This is an opportunity to pre-position you for FEMA-VDEM Hazard Mitigation Grant Programs. We do not do the grant application of course, but we evaluate the structure for mitigation opportunities, do a rough cost estimate, look for potential environmental or historic issues, and estimate benefits. We have funds in the contract for a small business to do this work, which is important for Tracey as Hampton has small business set-asides which need to be met.

    So bring your calendar and we'll talk through these issues and any others which arise. If I've missed anyone please forward. Thanks everyone!

Peninsula Mitigation Plan Update Kick Off Meeting
March 24, 2011 Sign-in Sheet

Name	Department/Organization	Phone	Fax	E-mail
Paul Long	York County	890.3600		longr@yorkcounty.gov
Curt Shaffer	Hampton EM	757.727.6067		cshaffer@hamptonva.gov
Sara Ruch	Hampton EM	757.262.7304		sruch@hamptonva.gov
Tracy Hanger	Hampton Fire	757.727.2288		thanger@hamptonva.gov
Kate Hale	James City County EM			khale@james-city.va.us
Bob Gregory	Newport News EM			rwgregory@nngov.com
Natalie Easterday	HRPDC	757.420.8300		neasterday@hrpdcva.gov
Deborah Mills	Dewberry	703.849.0100		dmills@dewberry.com
Ryan Towell	Dewberry	703.849.0100		rtowell@dewberry.com
Carrie Gonzalez-Wilson	Dewberry	703.849.0100		cgonzalez@dewberry.com

Peninsula 2011 Hazard Mitigation Plan Update
Conference Call Minutes April 19, 2011

Meeting Participants
Tracy Hanger - Hampton
Curt Schaffer – Hampton
Sarah Ruch– Hampton
Gwen Pointer– Hampton
Paul Long – York County
Ken Jones – Newport News
Deborah Mills - Dewberry
Ryan Towell - Dewberry
Carrie Gonzalez - Dewberry

1. **Review of Hazards in Vulnerability Analysis:**
   a. **Tornado:** Ryan is updating the hazard vulnerability analysis to capture the Saturday, April 16 storm which impacted the Peninsula but had deadly effects both south and north of the targeted planning area. He will include GIS coordinates once NOAA's NWS confirms the storm's path and update the tornado history tables. The map showing past event locations will be updated.
   b. **Human-caused:**, Curt shared that Hampton City Council will review the entire plan during their afternoon "closed door working session" with the plan minus redacted sections on the evening "open to the public agenda." He suggested that the other jurisdictions should follow a consistent approach since this is a regional plan. Deborah Mills offered that the Appendices will be re-lettered so that the redacted appendices are last so that when they are not visible to the public a gap in numbering will not appear. Robbie Coates had offered to check with Chesapeake on how they handled approval of their full plan when the human-caused section was redacted. He did not participate in this call.
   c. **Posting**: Deborah Mills reported that the vulnerability analysis section is complete except for the addition of the tornado information; formatting and technical editing has been completed. The remainder of the plan, including the introductory and strategy sections, is targeted for completion NLT May 2. We will then post the document to the FTP site for download as it is too large for Share Point site upload.
2. **Public Outreach:**
   Deborah Mills and Carrie Wilson-Gonzalez reported that our web developer sub-contractor will meet with Dewberry tomorrow to finalize the website content. We will not post the entire vulnerability analysis but will show key maps and tables with some introductory material. This will lead to the survey.
   The committee asked that on the survey, the hazards be edited to remove landslide/shrink-swell soils and to add coastal erosion/landslide. Space for identification of specific geographic "trouble spots" will also be added. Carrie will send an updated version of the survey to the committee prior to posting. We are using Survey Monkey for the survey, Dewberry will compile results.
   We are partnering to post on the Hampton Roads Planning District Commission website, we'll provide linkage addresses so you can put a link on your websites. We'll need screen captures to add to the plan.
3. **Plan Public Meetings & Adoption:** A lengthy discussion was held regarding open houses or public meetings. This is not required by the FEMA guidance but it may be something you wish to

do to maintain transparency. Hampton has previously indicated a need for a public open house. This is a jurisdiction-by-jurisdiction decision, you know your stakeholders. With the website, we only are required to have one more outreach activity, more are certainly desirable. Scheduling is tight with the FEMA grant and subsequently Dewberry's contract with Hampton presently scheduled to end June 30, 2011. Tracy may pursue a request for an extension. Most local plan adoptions of the 2006 plan expire between August and October, 2011. Deborah will strive to get a final plan draft to the committee NLT Monday, May 2.

4. **Finalization of Mitigation Action and Strategy Worksheets:** Carrie shared that we have received Hampton, Williamsburg and York County action tables. These may need some work with respect to funding sources, etc. Dewberry will support you in determining this. We must have those completed for incorporation into the plan draft. Carrie will support you on a one-on-one basis. Curt mentioned an addition to the Hampton actions to accommodate recent economic support to residential property owners wishing to elevate their homes. Carrie will return the current strategy worksheet for this update by Hampton.
5. **Project Scoping:** $20,000 is in the budget for NRW, a Virginia Beach A & E firm to evaluate potential mitigation projects and complete project data sheets. These serve as a bridge between a VDEM one or two page pre-application and a full application. The blank form and a West Virginia example will be posted to the Share Point site.
   Ideas for scoping included residential mitigation, stormwater management (quantity), localized drainage, evaluation of shelters for hardening to expand capacity, pumping stations. Ideally these visits should be conducted in May; they are not a required element of the plan but they must be completed within the period of performance of the grant.
6. **Match:** Match continues to be a challenge; Tracy will continue to work with VDEM to more evenly pro-rate local jurisdiction match targets. Loaded staff hourly rates are still needed and should be provided to Carrie. Dewberry will keep these confidential with the exception of providing to Tracy for conveyance to VDEM.
7. **Next Steps:**
   a. Plan draft to committee targeted for May 2, posted to FTP site.
   b. Follow-up call or meeting to get comments on draft prior to submittal to VDEM/FEMA for conditional approval.
   c. Website will go "live" after we receive final input on survey.
   d. Deborah is not available to support public outreach meetings the week of May 16; other Dewberry staff can be available. Any meetings, etc. need to be scheduled prior to plan adoption meetings with your local governing boards.
   e. Tracy will coordinate a potential grant extension with VDEM; Note that FEMA prefers 60 days notice for extension requests.

Peninsula Mitigation Plan Update Conference Call
April 19, 2011 Sign-in Sheet
2pm – 3pm

Name	Department/Organization	Phone	Fax	E-mail
Paul Long	York County	890.3600		longr@yorkcounty.gov
Curt Shaffer	Hampton EM	757.727.6067		cshaffer@hamptonva.gov
Sara Ruch	Hampton EM	757.262.7304		sruch@hamptonva.gov
Tracy Hanger	Hampton Fire	757.727.2288		thanger@hamptonva.gov
Ken Jones	Newport News			
Gwen Pointer	Hampton			gpointer@hamptonva.gov
Deborah Mills	Dewberry	703.849.0100		dmills@dewberry.com
Ryan Towell	Dewberry	703.849.0100		rtowell@dewberry.com
Carrie Gonzalez-Wilson	Dewberry	703.849.0100		cgonzalez@dewberry.com

Hampton

HIRA Review
Sign in Sheet Feb 24, 2011

Name	Department	Time in	Time Out
Mary Hough	HDHS	1:20	
Susan Canny	HPD	1:20	
Liz Wisley	911/311/AC	1:25	
David Stromberg	CDD-Planning	1:25	
James Bailey	Hampton City Schools	1:25	
Richard Flannery	HRPDC	1:30	
Curt Shaffer	Hampton FM	1:30	
John Yorles	Public Works	1:30	
Bill Berg	Health Dept	1:30	
Tom Sawyer	HCS	1:30	
Joe Sanders	Risk Mgmt	1:30	

2/23/11
James City County EOC

James City County Hazard Mitigation Plan Update HIRA/Mitigation Strategy Meeting
Sign-in Sheet

Initials	Name	Department/Organization	Phone	E-mail
KH	Kate Hale	James city co EM	757 564-2141	khale@james-city.va.us
BR	Bob Ryall	James City Co. Fire/EMS	757 565-7603	bryalls@James-city.VA.US
DEC	DARRYL COOK	GEN SERV/STORMWATER	259-1442	decook@james-city.va.US
SAR	Stephen Rubino	James City Co Police	259-5142	stephenr@james-city.va.us
NE	Natalie Easterday	HRPDC	757-420-8300	neasterday@hrpdcva.gov
BJR	Brad Rinehimer	JCCPD	253-2018	bradleyr@james-city.va.us
EH	Emmett Harmon	JCCPD	259-5141	eharmon@james-city.VA.US
SS	Stan Stout	JCCPD	259-5143	sbstout@james-city.VA.US
RT	Ryan Towell	Dewberry	(703) 849-0275	rtowell@dewberry.com
CG	Carrie Gonzalez	Dewberry	703 849 0154	cgonzalez@dewberry.com

2/23

Newport News Hazard Mitigation Plan Update HIRA/Mitigation Strategy Meeting
Sign-in Sheet

Initials	Name	Department/Organization	Phone	E-mail
	KENNETH JONES	NEWPORT NEWS FD/EM	269-2900	KJONES@NNGOV.COM
	TRENT STURGIS	NEWPORT NEWS P.D.	928-4304	STURGISATE.NNGOV.COM
	PARIMAL PATEL	NN WATERWORKS	234-4879	PPATEL@NNGOV.COM
	BRIAN LEWIS	ENGINEERING	926-8314	blewis@nngov.com
	CARL JACKSON	PLANNING	926-3834	CEJACKSN@NNGOV.COM
	DOUG CROWSON	FIRE	269-2902	DCROWSON@NNGOV.COM
	MIKE NALL	CODES	926-3809	MNALL@NNGOV.COM
	Donald Green	NNPS	8815061	donald.green@NN.K12.VA.US
	Robert Lee	Newport News Fire	926-8404	rolee@nngov.com
	HAROLD ROACH	NEWPORT NEWS CODES	926-8053	HROACH@NNGOV.COM
	Richard Flannery	HRPDC	420 8300	RFLANNERY@HRPDCVA.GOV
	Robert Gray	NNEM	269-2903	RWGRAY@NNGOV.COM
	BOB GREEN	RED CROSS	838-7320	bgreen@hrredcross.org

	Ryan Towell	Dewberry	(703) 849-0275	rtowell@dewberry.com
	CarmeGonzalez	Dewberry	703 8490154	cgonzalez@dewberry.com

2/25/11

Williamsburg Hazard Mitigation Plan Update HIRA/Mitigation Strategy Meeting
Sign-in Sheet

Initials	Name	Department/Organization	Phone	E-mail
	Carrie Gonzalez	Dewberry	703 8490154	cgonzalez@dewberry.com
	STANLEY SKINNER	Williamsburg Planning	757 220-6155	SSKinner@williamsburgva.gov
	Jim Goltry	Red Cross / CoLVA	757-253-0228	jsoltry@cvc-redcross.org
	Susan Geary	Williamsburg Police Dept	757-259-7210	sgeary@williamsburgva.gov
	PAT DENT	Williamsburg FIRE	757-220-6225	wdent@williamsburgva.gov
NE	Natalie Easterday	HRPDC	757-420-8300	neasterday@hrpdcva.gov
	Ryan Towell	Dewberry	(703) 849-0275	rtowell@dewberry.com

York County 2/24/11

York County Hazard Mitigation Plan Update HIRA/Mitigation Strategy Meeting
Sign-in Sheet

Initials	Name	Department/Organization	Phone	E-mail
RT	Ryan Towell	Dewberry	(703) 849-0275	rtowell@dewberry.com
CG	Carrie Gonzalez	Dewberry	703 849 0154	cgonzalez@dewberry.com
NE	Natalie Easterday	HRPDC	757-420-8300	neasterday@hrpdcva.gov
AP	Amy PARKER	YORK CTY PLANNING	757 890-3495	aparker@yorkcounty.gov
KRL	KORINE R LEONARD	YORK GIS	757 890 3584	leonardk@yorkcounty.gov
CIP	Claiborn Phillips	York GIS	7578903581	claiborn.Phillips@yorkcounty.gov
AMM	Al Maddalena	York EDS	757 890-3551	maddalena@yorkcounty.gov
RPL	R. Paul Long	York Co. Fire	757 890 3600	Longr@yorkcounty.gov
CCB	Connie BENNETT	York Co. EDS-SWM	(757) 890-3756	bennettc@yorkcounty.gov
SPK	Steve Kopczynski	York Co Fire & Life Safety Fire Chief/Coord. of EM	(757) 890-3612	kopczyns@yorkcounty.gov